YUKON RIVER FALL CHUM SALMON STOCK STATUS AND DEVELOPMENT OF MANAGEMENT/ACTION PLAN OPTIONS

A Report to the Alaska Board of Fisheries

By:

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SECTION I

Yukon River Fall Chum Salmon Stock Status

Synopsis

In response to the guidelines established in the "Sustainable Salmon Fisheries Policy", Yukon River fall chum salmon stock has been classified as a stock of concern. This classification is based on the definition of "yield concern" found in the policy. The Yukon River fall chum salmon stock meets the definition of a yield concern based on low harvest levels since 1997 and the anticipated low harvest level in 2001. From 1974 through 1999, the average run size has been an estimated 760,000 fall chum salmon and includes an average total Yukon River drainage harvest of 355,000 fish and an average escapement of 407,000 fish (Figure 3). The optimal drainage-wide escapement goal (350,000 fall chum salmon) was not achieved in 1998 and 2000 despite the use of specific management measures designed to reduce harvest and increase spawning escapements. Individual spawning area escapements tend to vary each year depending on distribution. However, several individual goals such as the Toklat River have not been met for several years. The recent poor drainage-wide runs have been produced from years in which fall chum salmon escapement goals were achieved and therefore are of concern.

Escapement

Fall chum salmon escapement goals are based on aerial surveys, sonar estimates, weir counts and foot surveys. Minimum biological escapement goals of total fall chum salmon spawning abundance have been established in the Delta, Toklat, Sheenjek, and Fishing Branch Rivers within the Yukon River drainage, and there is a rebuilding escapement goal of greater than 80,000 fall chum salmon for the Canadian mainstem Yukon River. The Fall Chum Salmon Management Plan (Table 1) identifies a drainage-wide escapement goal of 400,000 chum salmon when the projected run size is greater than 550,000 fish. In years with poor runs the *optimal* escapement goal is a minimum of 350,000 fall chum salmon. Canadian mainstem Yukon River border passage commitments (the rebuilding escapement plus fish to provide for Canadian harvests) and escapement goals for all four indexed tributaries were achieved in 1994 and 1995, and in all, except the Toklat River, in 1996. In 1999 fall chum salmon escapements were particularly poor to the Toklat, Sheenjek and Fishing Branch Rivers (Figures 4 and 5). Although data is preliminary, the 2000 fall chum salmon run will probably be classified as the weakest run on record. Based on extremely low passage of chum salmon, as detected in projects throughout the drainage, severe harvest restrictions and prohibitions were implemented. Although fall chum salmon harvests were minimized and the majority of the 2000 run were available as potential spawners, no escapement goals were achieved within the entire drainage.

1994

- Individual escapement goals in Alaska were achieved.
- Canadian spawning escapement goals were achieved.
- Drainage-wide escapement goal was achieved.
- Parent year escapements appeared fair.

1995

- Escapement goals in Alaska were achieved.
- Canadian spawning escapement goals were achieved.
- Drainage-wide escapement goal was achieved.
- Parent year escapements appeared fair.

1996

- Escapement goals in Alaska were achieved, except for the Toklat River.
- Canadian spawning escapement goals were achieved.
- Drainage-wide escapement goal was achieved.
- Parent year escapements appeared fair.

1997

- Escapement goals in Alaska were generally not achieved due to variable distribution. The Tanana River stocks were particularly weak.
- Canadian mainstem spawning escapement goal was achieved.
- Drainage-wide escapement goal was achieved.
- Parent year escapements appeared poor.

1998

- Escapement goals in Alaska were not achieved.
- Canadian spawning escapement goals were not achieved.
- Commercial, Personal Use and Sport fisheries were closed.
- Subsistence fishing was restricted in efforts to reduce harvests.
- Drainage-wide *optimal* escapement goal was not achieved.
- Parent year escapements appeared good.

1999

- Escapement goals in Alaska were not achieved, except for the Delta River.
- Canadian spawning escapement goals were not achieved.
- Drainage-wide escapement goal was achieved, although individual escapement goals were not.
- Commercial fishery was closed once the projected run dropped below the level recommended by the Fall Chum Salmon Management Plan.
- Personal Use fishery was closed.
- Further reductions in harvests (subsistence opportunity restrictions) probably would not have resulted in the achievement of escapement goals.
- Parent year escapements appeared exceptionally good.

2000

- Escapement goals in Alaska were not achieved.
- Canadian spawning escapement goals were not achieved.
- Drainage-wide *optimal* escapement goal was not achieved.
- Commercial, Personal Use and Sport fisheries were closed all season.

2000 (continued)

- Subsistence fishery was restricted from the beginning and eventually closed in efforts to reduce harvests.
- Further reductions in harvests would not have resulted in the achievement of escapement goals.
- Parent year escapements appeared exceptionally good.

Harvest

An average of 140,000 fall chum salmon are harvested annually for subsistence purposes. This five-year average is based on the years 1989 through 1993, which, except for 1993, represent more typical subsistence harvests (Figure 7). The commercial guideline harvest range (GHR) for fall chum salmon in the Alaska portion is 72,750 – 320,500. Commercial harvest of fall chum salmon (Figure 7) has fluctuated widely with no commercial harvests occurring in 1987, 1993, 1998 and 2000. The 1999 commercial harvest of 20,371 fall chum salmon was 72% below the lower end of the GHR. Specific management measures were implemented in 1997, 1998, 1999, and 2000 as recommended by the Fall Chum Salmon Management Plan in an effort to meet the drainage-wide escapement goal for fall chum salmon. Additionally since 1994, the utilization of the management directives outlined in the Fall Chum Salmon Management Plan, has resulted in harvests becoming proportional to run size and, therefore are probably more indicative of the actual harvestable surplus.

1994

- An estimated 123,600 fall chum salmon were harvested for subsistence. This level of subsistence harvest was near average.
- 7,999 fall chum salmon were harvested commercially, which was well below the lower end of the GHR.
- Commercial harvest occurred only in Districts 5 and 6 of the Yukon Area.

1995

- An estimated 151,900 fall chum salmon were harvested for subsistence. This level of subsistence harvest was average and includes 21,000 fall chum salmon carcasses available as by-product from commercial roe-fisheries.
- 283,057 fall chum salmon were harvested commercially, which was within the upper half of GHR.
- Commercial harvests occurred in all Yukon Area districts.

1996

- An estimated 145,300 fall chum salmon were harvested for subsistence. This level of subsistence harvest was average and includes 16,000 fall chum salmon carcasses available as by-product from commercial roe-fisheries.
- 105,630 fall chum salmon were harvested commercially, which was below the mid-point of GHR.
- Commercial harvests occurred in all Yukon Area districts.

1997

- An estimated 95,141 fall chum salmon were harvested for subsistence. This level of subsistence harvest was below average and appeared to affect fishermen dependent on the weaker return of Tanana River fall chum salmon stocks.
- 58,187 fall chum salmon were harvested commercially, which is below low end of GHR.
- Commercial harvests occurred through District 5 of Yukon Area.

1998

- An estimated 62,900 fall chum salmon were harvested for subsistence. This level of subsistence harvest was the lowest on record. Subsistence restrictions were implemented to reduce harvests due to poor fall chum salmon run.
- No fall chum salmon were harvested commercially, as in 1987 and 1993.

1999

- An estimated 89,900 fall chum salmon were harvested for subsistence. This level of subsistence harvest was below average.
- 20,371 fall chum salmon were harvested commercially, which was well below the lower end of the GHR.
- Commercial harvests occurred through District 4 of the Yukon Area.

2000

- Specific management actions severely reduced subsistence harvest opportunity.
- No fall chum salmon were harvested commercially, as in 1987, 1993, and 1998.

Outlook

Overall, the year 2001 fall chum salmon run is anticipated to be weak to below average in strength for the fifth consecutive year. Typically, the majority of fall chum salmon returning to the Yukon River are 4 and 5-year-old fish. Parent year escapements in 1996 were judged to be above average, while the 1997 escapement was slightly above average (Figure 3). Causes for the observed drop in productivity are still largely unknown, as are the duration and exact magnitude of current production levels. Given the uncertainties associated with recent declines in productivity, it is speculative whether the run will support any commercial harvest, and reductions in subsistence harvest opportunity may be necessary to achieve the optimal escapement goal.

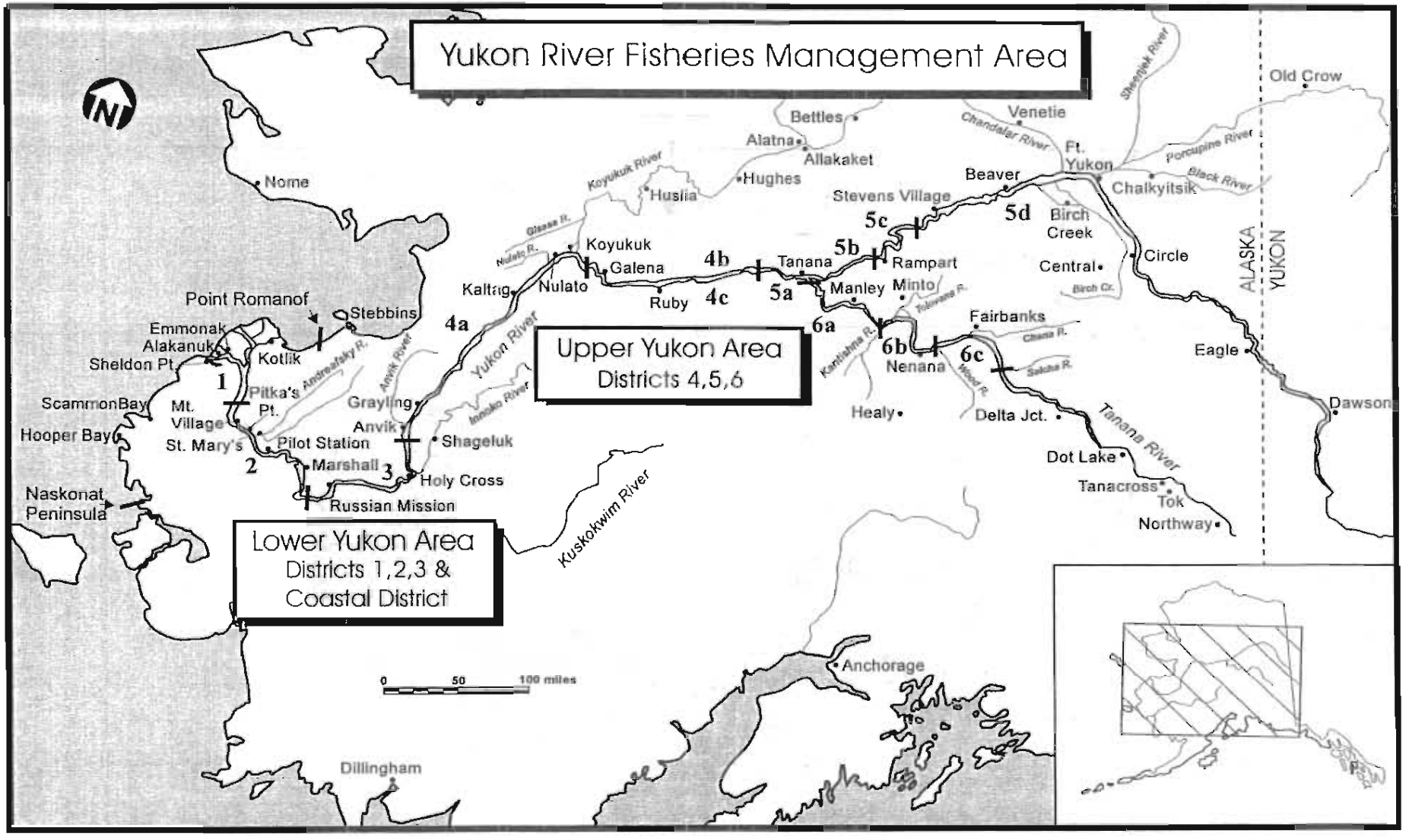


Figure 1. The Yukon Area showing communities and fishing districts, 2000.

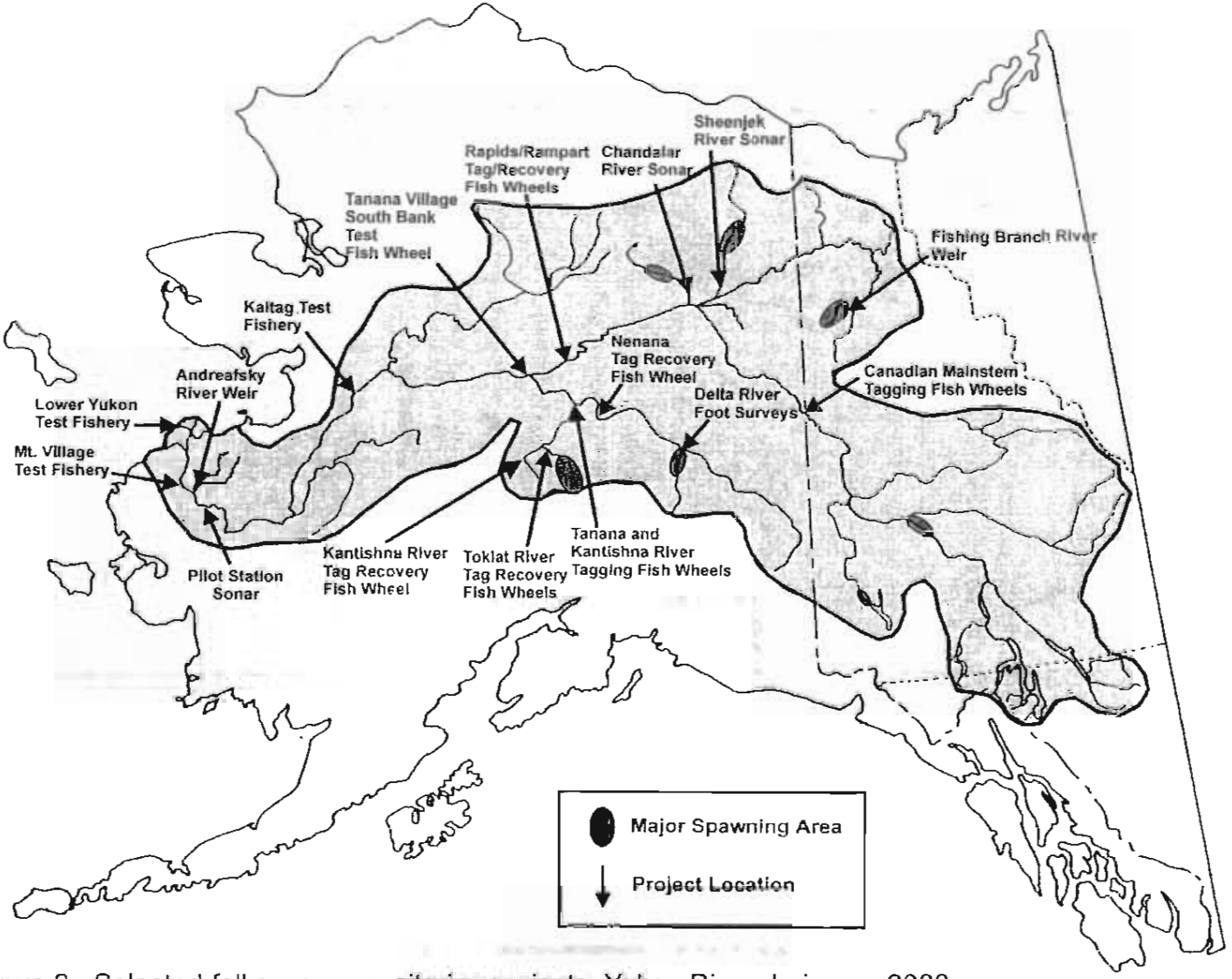


Figure 2. Selected fall season monitoring projects, Yukon River drainage, 2000.

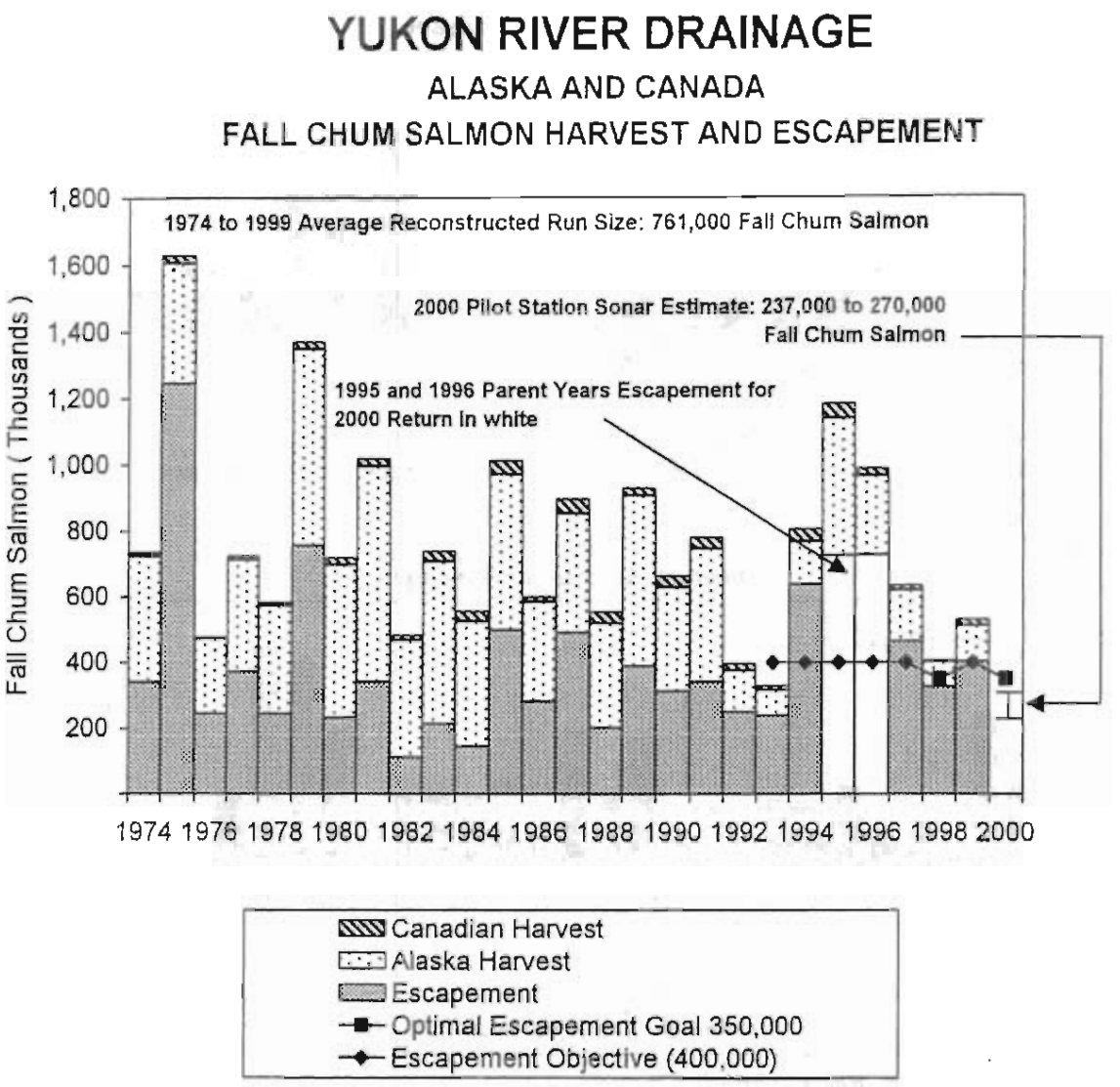


Figure 3. Estimated harvest and escapement, fall chum salmon, Yukon River drainage, 1974 to 1999, and the estimated passage range for Pilot Station in 2000.

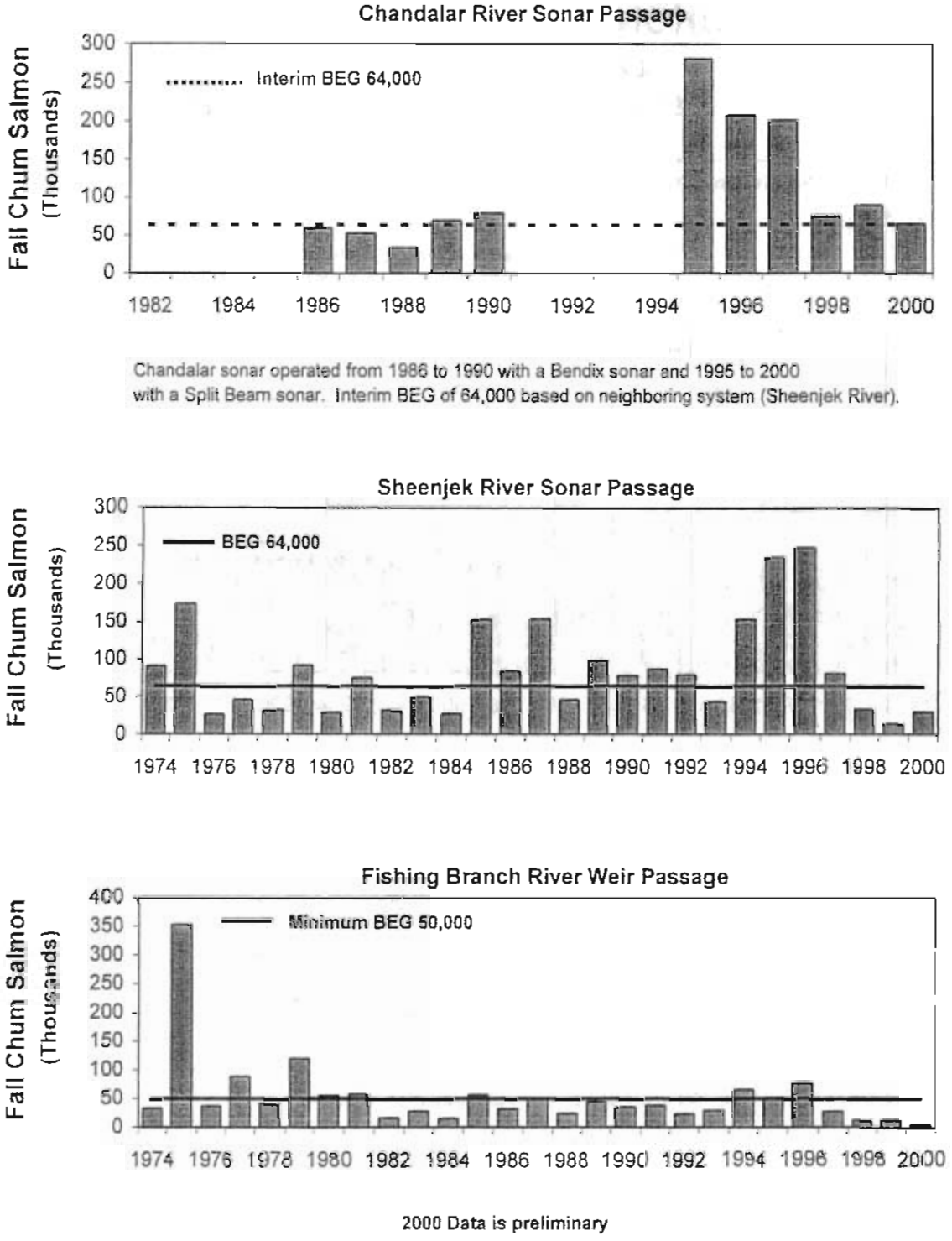


Figure 4. Estimated escapements and Biological Escapement Goals (BEG's) for the Chandalar, Sheenjek, and Fishing Branch Rivers, 1974 to 2000.

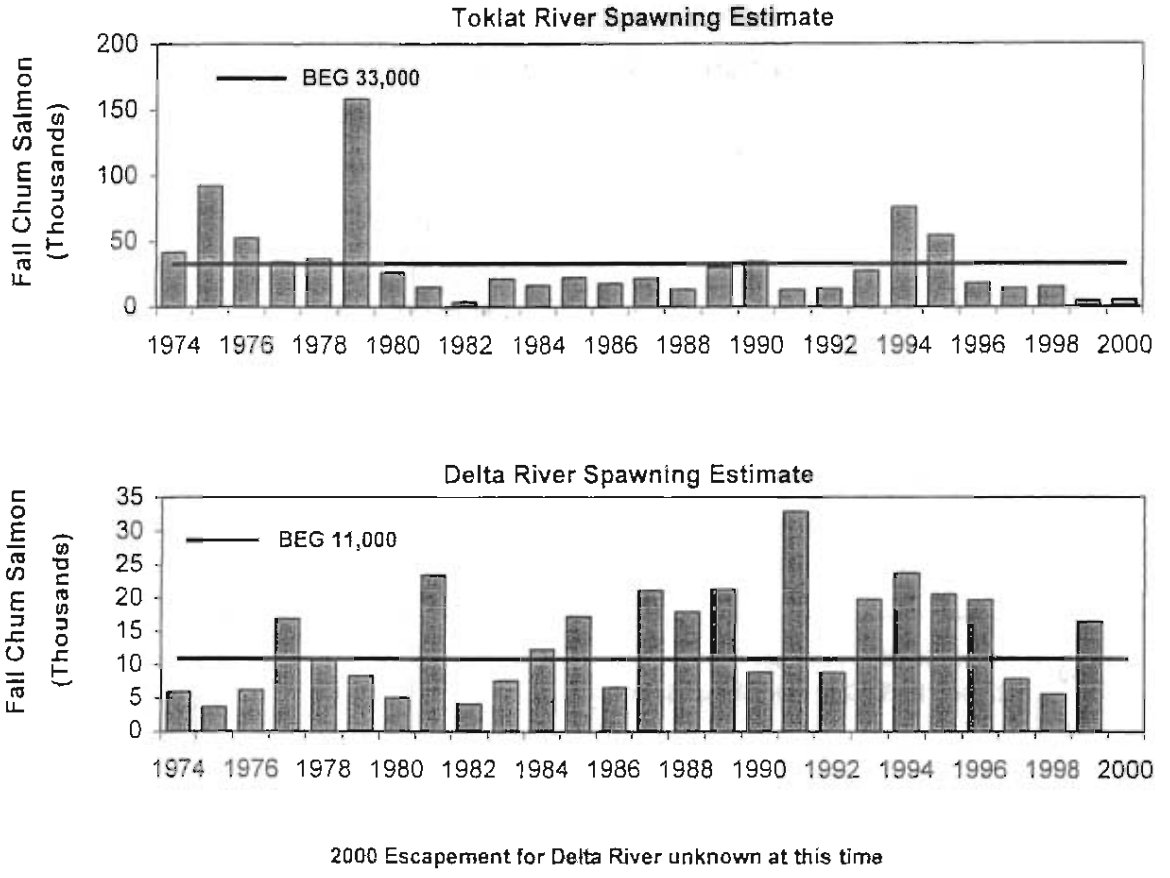


Figure 5. Estimated escapement and Biological Escapement Goals (BEG's) for the Toklat and Delta Rivers, 1974 to 2000.

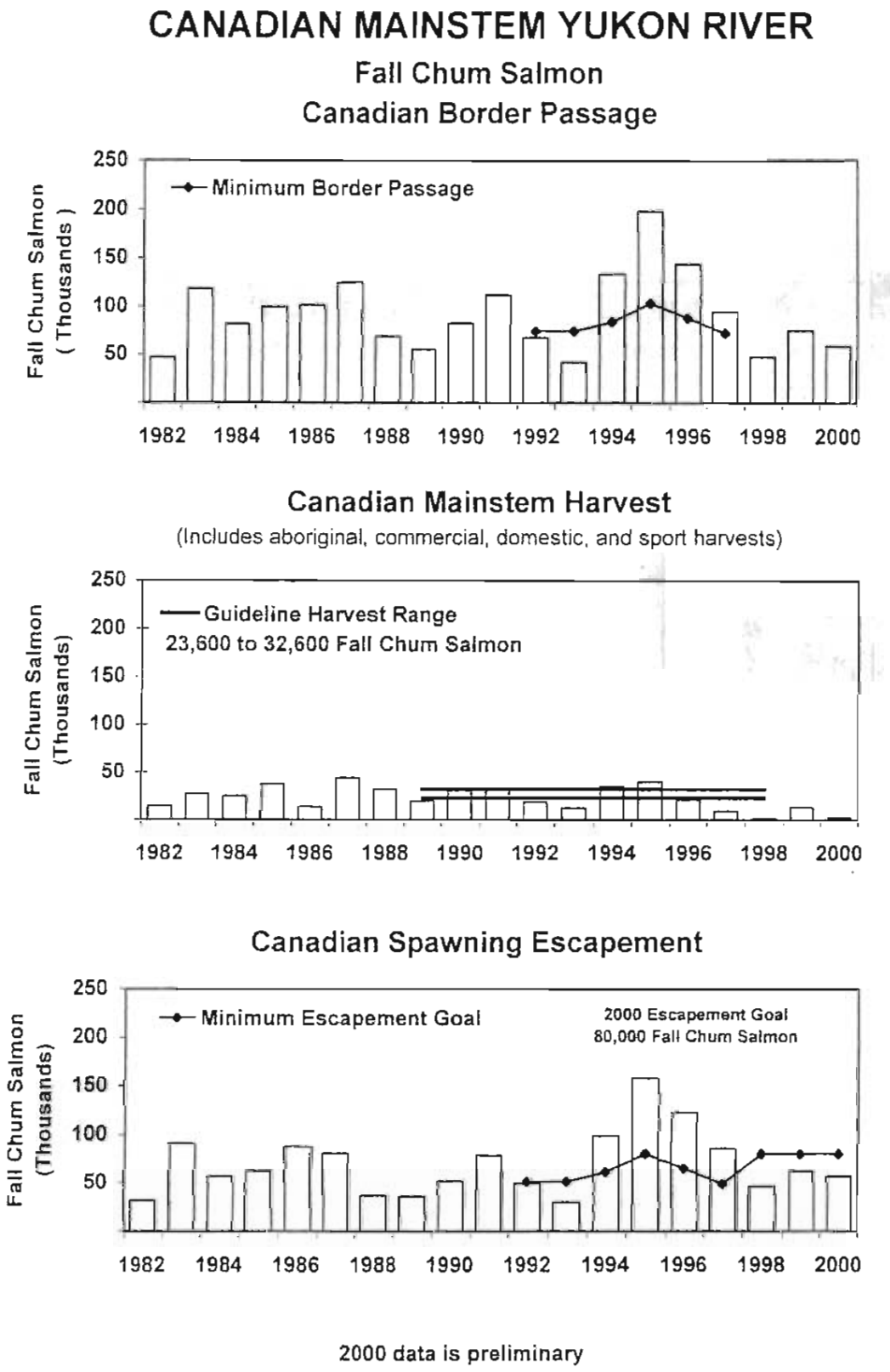
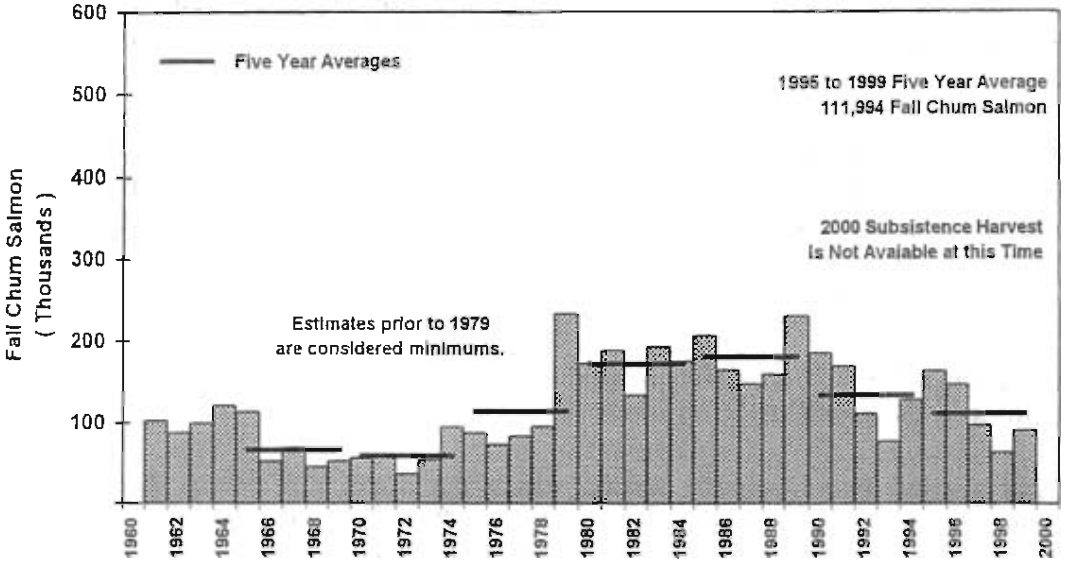


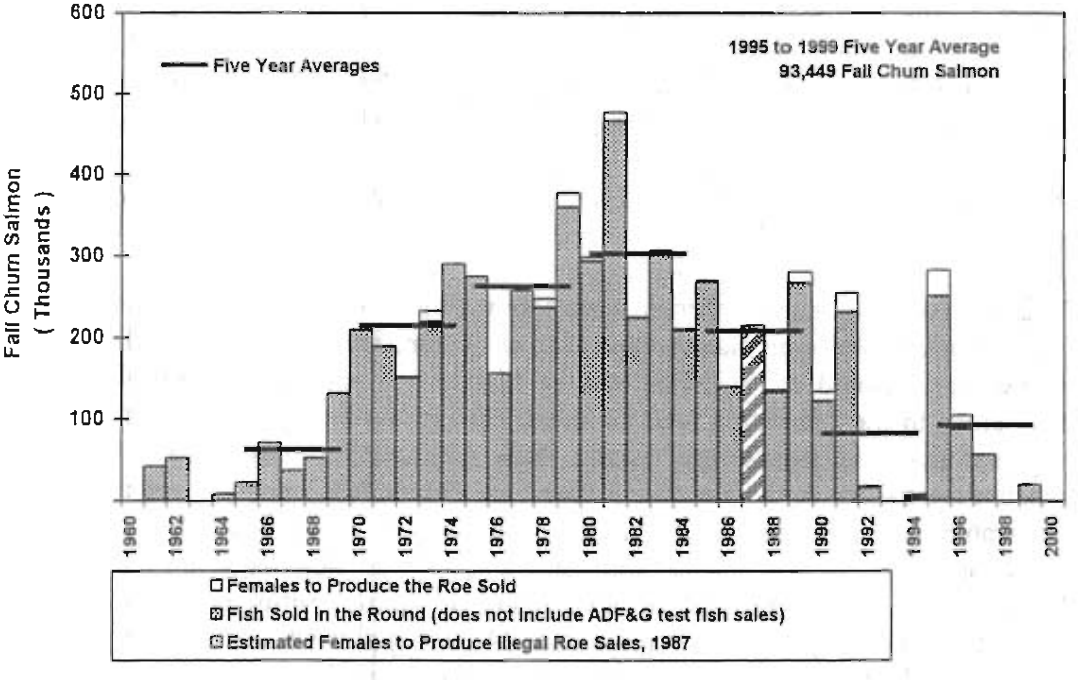
Figure 6. Canadian mainstem border passage, harvest and escapement estimates, 1982 to 2000, and targeted goals for the rebuilding period from 1992 through 1997, along with the minimum escapement goals for 1998 to 2000.

YUKON AREA, ALASKA
FALL CHUM SALMON

SUBSISTENCE USE



COMMERCIAL HARVEST



Note: Both graphs are on the same scale.

Figure 7. Subsistence use and commercial harvest of fall chum salmon, Yukon Area, Alaska, 1961 to 2000.

Figure 8. Kantishna River Conservation Actions Fall Chum Salmon

1986 - Toklat River spawning escapement goals for fall chum salmon were not met since 1979. Weak fall chum salmon returns to the system persisted with the poorest run on record occurring in 1982. Due to conservation concerns for fall chum salmon, subsistence salmon fishing on the Kantishna River was closed by emergency order on September 23.

1990 - Spring Board of Fisheries (BOF) meeting adopted a regulation which included: closure of the Toklat River and that portion of the Kantishna River downstream of the confluence of the Toklat River to subsistence, personal use, and sport fishing between July 15 and December 31, and restriction of commercial fishing in Subdistrict 6-A to a maximum of one 24-hour period per week during the fall season.

In September, the court failed to grant injunctive relief for two subsistence fishing families on the Kantishna River drainage.

1991 - Court granted two injunctive reliefs, which permitted four fishing families on the Kantishna River to harvest a maximum of 900 fall chum salmon each, for a total fishery harvest of 3,600 fall chum salmon. Department responded by reducing commercial fishing time in all fishing districts below the confluence of the Kantishna River. A poor escapement of 13,200 fall chum salmon was documented into the Toklat River.

1992 - Board of Fisheries February meeting in Bethel adopted a regulation to resume fall season subsistence fishing in the Kantishna River using fish wheels equipped with live boxes, and all chum salmon returned back into the river alive (August 15 – December 31). The BOF charged the Yukon River Drainage Fisheries Association to work jointly with the department to develop a rebuilding plan for Toklat River fall chum salmon.

Approximately 131,000 eggs were taken from Toklat River chum salmon stocks for incubation in Clear Hatchery.

1993 - Yukon River Drainage Fisheries Association (YRDFA) adopted a Toklat River fall chum salmon rebuilding management plan at its third annual meeting held in Emmonak in February. Board of Fisheries met in March and adopted the YRDFA proposal. Provisions in the rebuilding plan included: closing the Toklat River drainage to sport, personal use, and subsistence fishing from August 15 through May 15; restricting subsistence fishing in the Kantishna River, to 450 chum salmon per permit which was renewable up to a harvest limit of 2,000 chum salmon; using only fish wheels with live boxes once the 2,000 chum salmon harvest level was met; requiring the commercial fisheries to be managed to a lower level than maximum; limiting commercial fishing in Subdistricts 5-A and 6-A to not more than 24-hours per week; and limiting subsistence fishing in Subdistrict 5-A to not more than five days a week.

Figure 8. (page 2 of 3)

1993- Continued

Poorest fall chum salmon return on record. Subsistence salmon fishing restrictions were implemented on August 17, 1993, followed by subsistence salmon fishing closures on September 3, 1993.

Approximately 92,000 chum salmon fry were released into the Toklat River May 19 (all with Coded Wire Tags - CWT). Approximately 208,000 eggs were taken from Toklat River chum salmon stocks for incubation in Clear Hatchery.

1994 - Board of Fisheries meeting held in March in Huslia adopted the 1994 Toklat River Fall Chum Salmo Rebuilding Management Plan and the 1994 Yukon River Fall Chum Salmon Management Plan.

Board of Fisheries meeting in November adopted a Toklat River Fall Chum Salmon Rebuilding Management Plan (sunsets December 1997) and a 1995 Yukon River Fall Chum Salmon Management Plan. Escapement goals were achieved in all five spawning index areas including the Delta, Toklat, Sheenjek, Fishing Branch rivers and the Canadian mainstem.

Approximately 162,800 chum salmon fry were released into the Toklat River in late April (majority had CWT). Approximately 400,000 eggs were collected from Toklat Springs area (near Sushanna River) for incubation in Clear Hatchery.

1995 - Approximately 324,000 chum salmon fry were released into the Toklat River on April 23 (all with CWT). Approximately 300,000 eggs were collected in October from Toklat Springs area (near Sushanna River mouth) for incubation in Clear Hatchery.

1996- Approximately 186,000 chum salmon fry (with CWT) were released into the Toklat River on April 18.

First year of Toklat River CWT chum salmon return. Exploitation rates were estimated to be 25% in Subdistrict 5-A and 31% in Subdistrict 6-A.

1997 - Limited commercial fishing opportunity produced harvests less than half to one third of average in the Yukon Area. The minimum biological escapement goal was not attained in 1997 within the Toklat index area. The Board of Fisheries (BOF) meeting held in December in Fairbanks reviewed and modified the Toklat River Fall Chum Salmon Rebuilding Management Plan. Modifications included removal of many restrictive elements of the plan for the 1998 and 1999 seasons based on good parent year escapements for 4-year-olds returning in those years, with stipulations that if the minimum biological escapement goal was not attained in the Toklat index area in 1998 the original plan would remain in place for the following seasons (sunset was extended

Figure 8. (page 3 of 3)

through the year 2000). They retained the provision that the Toklat River would remain closed to sport and subsistence fishing between August 15 and May 15.

1998 - The minimum biological escapement goal was not attained in 1998 within the Toklat index area and the entire Toklat River Fall Chum Salmon Rebuilding Management Plan went back into effect for 1999 and 2000. No commercial fishing was allowed in the Yukon Area. Subsistence salmon fishing restrictions began August 27 and affected the Kantishna River. By late September, subsistence fishing in the area was reduced to one twenty-four hour period per week.

1999 - The minimum biological escapement goal was not attained in 1999 within the Toklat index area. Extremely limited commercial fishing opportunity was allowed in the Lower Yukon Area until run projection dropped dramatically below the level necessary to continue based on the Yukon River Drainage Fall Chum Salmon Management Plan.

2000 - The minimum biological escapement goal will probably not be attained in 2000 within the Toklat index area. No commercial fishing was allowed in the Yukon Area. Subsistence fishing restrictions during the summer season were carried over into the fall season based on performance of other salmon stocks and based originally on the level of subsistence needs being met. When the fall chum salmon run projection dropped below the level necessary to meet the targeted drainage-wide optimal escapement goal, further restrictions reduced the majority of the areas to 20 percent of their normal fishing time. Additional fall chum salmon did not materialize as the run progressed. The fall chum salmon projection continued to reflect levels below the targeted drainage-wide optimal escapement goal and subsistence fishing closures became effective beginning August 23.

Table 1. The Yukon River drainage fall chum salmon management plan, 2000.

Run Size Estimate *b* (Point Estimate)	Recommended Management Action *a* Fall Chum Salmon Directed Fisheries				Targeted Drainagewide Escapement
	Commercial	Personal Use	Sport	Subsistence	
350,000 or Less	Closure	Closure	Closure	Closure *c*	350,000
350,001 to 450,000	Closure	Closure	Closure	Restrictions *d*	350,000
450,001 to 550,000	Closure	Closure	Closure	Restrictions *d*	375,000
550,001 to 600,000	Closure	Closure *e*	Closure *e*	Restrictions *d*	400,000
600,001 to 675,000	Closure	Normal Fishing Schedules	Retention Allowed	Normal Fishing Schedules	400,000 or More
Greater Than 675,000	Commercial Fishing Considered *f*	Normal Fishing Schedules	Retention Allowed	Normal Fishing Schedules	400,000 or More

a Considerations for the Toklat River and Canadian Mainstem rebuilding plans may require more restrictive management actions.

b The department will use the best available data including preseason projections, mainstem river sonar passage estimates, test fisheries indices, subsistence and commercial fishing reports, and passage estimates from escapement monitoring projects to assess the run size.

c The department may, by emergency order, allow subsistence chum salmon directed fisheries where indicator(s) suggest that the escapement goal(s) in that area will be achieved.

d The department may, by emergency order, allow a less restrictive or a normal subsistence fishing schedule in areas that indicator(s) suggest that the escapement goal(s) in that area will be achieved.

e The department may, by emergency order, allow personal use and sport fishing in areas that have normal subsistence fishing schedules and indicator(s) that suggest the escapement goal(s) in that area will be achieved.

f When the projected run size is more than 675,000 chum salmon, the department may allow for a drainage-wide commercial fishery with the targeted harvest of the surplus above 625,000 chum salmon distributed by district or subdistrict proportional to the guideline established in harvest range 5 AAC 05.365. The department shall distribute the harvest at levels below the low end of the guideline harvest range by district or subdistrict proportional to the mid-point of the guideline harvest range.

5 AAC 05.365. (4) manage the commercial fishery during the fall chum salmon season for a guideline harvest range of 72,750 to 320,500 chum salmon, distributed as follows:

(A) Districts 1, 2 and 3:	60,000 to 220,000 chum salmon;
(B) Subdistricts 4-B and 4-C:	5,000 to 40,000 chum salmon;
(C) Subdistrict 5-A:	0 to 4,000 pounds chum salmon roe;
(D) Subdistricts 5-B and 5-C:	4,000 to 36,000 chum salmon;
(E) Subdistrict 5-D:	1,000 to 4,000 chum salmon;
(F) District 6:	2,750 to 20,500 chum salmon.

Table 2. Fall chum salmon passage estimates or escapement estimates for selected spawning areas in the Alaskan portion of the Yukon River drainage, 1971 to 2000. a

	Alaska								
		Tanana River Drainage				Upper Yukon River Drainage			
Year	Yukon River Mainstem Sonar Estimate	Toklat River b	Upper Tanana River Tagging Estimate c	Delta River d	Bluff Cabin Slough e	Rampart Rapids Tagging Estimate f	Chandalar River g	Sheenjek River h	
1971									
1972				5,384					
1973				10,469					
1974		41,798		5,915				89,966	j
1975		92,265		3,734	k			173,371	j
1976		52,891		6,312	k			26,354	j
1977		34,887		16,876	k			45,544	j
1978		37,001		11,136				32,449	j
1979		158,336		8,355				91,372	j
1980		26,346		5,137				28,933	j
1981		15,623		23,508				74,560	
1982		3,624		4,235		1,156		31,421	
1983		21,869		7,705		12,715		49,392	
1984		16,758		12,411		4,017		27,130	
1985		22,750		17,276	k			152,768	
1986		17,976		6,703	k	3,458		84,207	m
1987		22,117		21,180		9,395		153,267	m
1988		13,436		18,024				45,206	m
1989		30,421		21,342	k			99,116	m
1990		34,739		8,992	k	1,632		77,750	m
1991		13,347		32,905	k	7,198		86,496	n
1992		14,070		8,893	k			78,808	n
1993	292,000	27,838		19,857				42,922	n
1994		76,057		23,777	k			153,013	n p
1995	1,247,000	54,513	r 268,173	20,587		19,460		280,999	235,000 n p
1996		18,264	134,563	p 19,758	k	3,920	654,296	208,170	247,965 n p
1997	623,367	14,511	71,661	7,705	k	3,145	369,546	199,874	80,423 s
1998	397,157	15,605	62,384	7,804	k	2,110	194,963	75,811	32,894
1999	510,891	4,551	104,869	16,534		5,078	189,742	88,662	14,229
2000 p	253,512	5,095	e 47,635					64,500	30,000
All Years Average	553,988	32,840	114,881	13,304		6,107	352,137	110,105	84,613
Five Year Average 1995-1999	-	21,489	128,330	15,926		-	-	170,703	122,102
Biological Escapement Goal		> 33,000		> 11,000				> 64,000	t

-Continued-

Table 2. Fall chum salmon passage estimates or escapement estimates for selected spawning areas in the Alaskan portion of the Yukon River drainage, 1971 to 2000. a

a	Latest table revision December 12, 2000.
b	Total abundance estimates for the upper Toklat River drainage spawning index area using stream life curve method developed with 1987 to 1993 data.
c	Fall chum salmon passage estimate for the upper Tanana River drainage based on tag deployment from a fishwheel (two fishwheels in 1995) located just upstream of the Kantishna River and recaptures from two fishwheels located downstream from the village of Nenana.
d	Total escapement estimate generated from the migratory time density curve method, unless otherwise indicated.
e	Peak counts from foot or aerial surveys.
f	Fall chum salmon passage estimate for the upper Yukon River drainage based on tag deployment at two fishwheels located at the "Rapids" and recaptured at two fishwheels located near the village of Rampart.
g	Side-scan sonar estimate, in 1986 through 1990. Split beam sonar estimate since 1995.
h	Side-scan sonar estimate unless otherwise indicated.
j	Total escapement estimate using sonar to aerial survey expansion factor of 2.22.
k	Population estimate generated from replicate foot surveys and stream life data (area under the curve method).
m	Expanded estimates for period approximating second week August through middle fourth week September, using Chandalar River run timing data.
n	Total abundance estimates are for the period approximating second week August through middle fourth week of September. Comparative estimates prior to 1986 are considered more conservative; approximating the period of the end of August through the middle week of September.
p	Preliminary.
r	Minimal estimate because of late timing of ground surveys with respect to peak of spawning.
s	The passage estimate includes an additional 15,134 salmon that were estimated to have passed during 127 hours that the sonar was inoperable to high water from August 29 until September 3, 1997.
t	Based on escapement estimates for the years 1974 to 1990.

Table 3. Fall chum salmon passage estimates or escapement estimates for selected spawning areas in the Canadian portion of the Yukon River drainage, 1971 to 2000. [a]

	Canada					Canadian Mainstem		
Year	Fishing Branch River [b,c]	Mainstem Yukon River Index [c,d]	Koidern River [c]	Kluane River [c,f]	Teslin River [c,g]	Border Passage Estimate	Harvest	Spawning Escapement Estimate [h]
1971	312,800							
1972	35,125 [j]			198 [k,m]				
1973	15,989 [n]	383		2,500				
1974	32,525 [n]			400				
1975	353,282 [n]	7,671		362 [m]				
1976	36,584			20				
1977	88,400			3,555				
1978	40,800			0 [m]				
1979	119,898			4,640 [m]				
1980	55,268			3,150		39,130	16,218	22,912
1981	57,386 [p]			25,806		66,347	19,281	47,066
1982	15,901	1,020 [r]		5,378		47,049	15,091	31,958
1983	27,200	7,560		8,578 [m]		118,365	27,490	90,875
1984	15,150	2,800 [s]	1,300	7,200	200	81,900	25,267	56,633 [z]
1985	56,016 [n]	10,760	1,195	7,538	356	99,775	37,765	62,010
1986	31,723 [n]	825	14	16,686	213	101,826	13,886	87,940
1987	48,956 [n]	6,115	50	12,000		125,121	44,345	80,776
1988	23,597 [n]	1,550	0	6,950	140	69,280	32,494	36,786
1989	43,834 [n]	5,320	40	3,050	210 [k]	55,861	20,111	35,750
1990	35,000 [v]	3,651	1	4,683	739	82,947	31,212	51,735
1991	37,733 [n]	2,426	53	11,675	468	112,303	33,842	78,461
1992	22,517 [n]	4,438	4	3,339	450	67,962	18,880	49,082
1993	28,707 [n]	2,620	0	4,610	555	42,165	12,422	29,743
1994	65,247 [n]	1,429 [k]	20 [k]	10,734	209 [k]	133,712	35,354	98,358
1995	51,971 [n,x]	4,701	0	16,456	633	198,203	40,111	158,092
1996	77,278 [n]	4,977		14,431	315	143,758	21,329	122,429
1997	26,959	2,189		3,350	207	94,725	9,286	85,439
1998	11,912	7,292		7,337	236	48,047	1,742	46,305
1999	12,904			4,206	19 [k]	75,541	13,506	62,035
2000 [y]	5,072 [n]					59,598	3,110	56,488
All Years Average	59,524	4,091	223	6,744	330	88,744	22,512	66,232
Five Year Average 1994-1998	46,673	4,118	-	10,462	320	123,689	21,564	102,125
Biological Escapement Goal [w]	50,000-120,000							>80,000

- continued -

Table 3. (page 2 of 2).

a Latest table revision December 12, 2000.
b Located within the Canadian portion of the Porcupine River drainage. Total escapement estimated using weir to aerial survey expansion factor of 2.72, unless otherwise indicated.
c Aerial survey count unless otherwise indicated.
d Tatchun Creek to Fort Selkirk.
f Duke River to end of spawning sloughs below Swede Johnston Creek.
g Boswell Creek area (5 km below to 5 km above confluence).
h Excludes Fishing Branch River escapement (estimated border passage minus Canadian removal).
j Weir installed on September 22. Estimate consists of a weir count of 17,190 after September 22, and a tagging passage estimate of 17,935 prior to weir installation.
k Incomplete and/or poor survey conditions resulting in minimal or inaccurate counts.
m Foot survey.
n Weir count.
p Initial aerial survey count was doubled before applying the weir/aerial expansion factor of 2.72 since only half of the spawning area was surveyed.
r Boat survey.
s Total index area not surveyed. Survey included the mainstem Yukon River between Yukon Crossing to 30 km below Fort Selkirk.
t Escapement estimate based on mark-recapture program unavailable. Estimate based on assumed average exploitation rate.
v Weir was not operated. Although only 7,541 chum salmon were counted on a single survey flown October 26, a population estimate of approximately 27,000 fish was made through date of survey, based upon historic average aerial-to-weir expansion of 28%. Actual population of spawners was reported by DFO as between 30,000-40,000 fish considering aerial survey timing.
w Interim escapement objective.
x Incomplete count due to late installation and/or early removal of project or high water events.
y Preliminary.

Table 4. Estimated fall chum salmon subsistence harvest by fishing district and by community of residence, Yukon Area, 1988-1999. a

Community	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	1988-1993 Average	1994-1998 Average
Hooper Bay	1,711 b	146 b			127	113	284	297	392	0	0	0	524 c	177
Scammon Bay	551 b	10 b			79	7	63	147	0	0	34	204	162 c	49
Coastal District Subtotal	2,262	156			206	120	347	354	392	0	34	204	686	225
Sheldon Point	289	586	102	84	490	158	25	256	21	337	266	115	284	181
Alakanuk	1,194	430	267	193	401	182	73	631	100	900	665	558	295	474
Emmonak	1,792	840	2,353	2,027	1,628	1,507	3,441	1,614	1,501	1,039	867	1,849	1,671	1,692
Kotlik	2,200	3,058	2,613	1,631	2,697	5,923	1,348	2,197	2,025	856	1,305	3,980	3,184	1,658
District 1 Subtotal	5,475	4,914	5,335	3,935	5,216	7,770	4,887	4,698	4,147	3,132	3,163	6,502	5,434	4,005
Mountain Village	1,880	4,641	1,566	1,473	1,052	1,113	797	1,347	1,366	2,698	2,031	1,968	1,969	1,648
Pitkas Point	622	275	150	610	77	268	294	99	603	178	233	53	276	281
St. Marys	1,911	1,695	806	1,592	2,356	440	1,062	542	658	310	416	722	1,378	598
Pilot Station	1,372	1,872	1,941	1,082	1,170	1,017	1,527	575	448	1,106	1,152	1,155	1,412	964
Marshall	2,815	1,532	1,724	891	2,727	256	471	784	2,212	368	640	696	1,426	893
District 2 Subtotal	8,600	10,015	6,187	5,628	7,382	3,094	4,151	3,317	5,287	4,660	4,482	4,594	6,461	4,383
Russian Mission	1,151	308	878	425	648	172	11	865	587	0	137	100	486	320
Holy Cross	596	711	1,178	190	845	1,086	665	681	1,614	420	1,095	239	798	935
Shageluk	0	4	0	0	865	211	186	126	305	367	329	76	216	263
District 3 Subtotal	1,747	1,023	2,056	615	2,358	1,449	862	1,672	2,706	787	1,561	415	1,500	1,518
Lower Yukon River Total	15,822	15,952	13,578	10,178	14,956	12,313	9,900	9,687	12,140	8,599	9,206	11,511	13,395	9,906
Anvik	136	168	583	452	894	420	155	269	457	514	388	126	503	357
Grayling	1,760	830	1,405	3,616	2,993	2,083	811	1,155	1,759	1,531	648	1,370	2,185	1,181
Kaltag	2,293	1,654	2,327	2,834	2,522	704	630	644	1,049	1,142	499	764	2,006	793
Nulato	1,673	2,436	3,546	1,637	1,910	571	1,109	1,137	2,299	697	367	2,338	2,020	1,122
Koyukuk	587	2,460	860	2,761	2,817	2,052	1,049	814	2,458	1,954	1,583	1,544	2,190	1,572
Galena	4,306	6,436	3,202	5,525	2,393	3,255	3,963	3,202	6,620	3,370	1,915	1,932	4,162	3,814
Ruby/Kokrines	5,171	6,599	3,352	2,856	4,499	1,085	5,553	4,695	561	2,195	2,427	907	3,678	3,066
District 4 Yukon River Subtotal (Excluding the Koyukuk River)	15,928	20,583	15,275	19,681	18,028	10,170	13,270	11,916	15,203	11,403	7,827	8,981	16,747	11,924
Huslia	1,697	1,726	846	411	1,286	258	55	1,035	298	10	0	89	906	280
Hughes	311	260	70	270	325	169	0 d	263	274	51	60	84	219	130
Allakaket	326	1,969 f	2,470	475	1,452	233	0 d	260	961	270	11	20	991 g	300
Alatna	117	- f	560	38	127	2	0 d	0	0	0	0	0	173 g	0
Bettles	0	0	0	0	14	0	0	583	50	0	0	0	3	127
Koyukuk River Subtotal	2,451	3,957	3,966	1,194	3,204	662	55	2,141	1,583	331	71	193	2,291	836
District 4 Subtotal	18,378	24,540	19,241	20,875	21,232	10,832	13,325	14,057	16,786	11,734	7,898	9,174	19,039	12,760

-Continued-

Table 4. (page 2 of 2)

Community	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	1988-1993 Average	1994-1998 Average
Tanana	55,998	40,845	41,145	40,868	19,365	23,103	34,681	14,409	21,420	25,058	24,956	22,305	33,065	24,105
Rampart	3,600	2,472	10,818	5,801	5,701	3,272	1,007	1,403	896	646	100	4,324	5,613	810
Fairbanks h j	0	7	82	2,022	2,491	930	2,870	2,184	2,727	491	96	681	1,106	1,674
Stevens Village k	1,451	6,633	3,857	2,481	150	882	45	3,194	991	1,585	1,076	20	2,797	1,378
Beaver	96	7,242	757	7	361	692	2,069	1,231	9	243	409	16	1,812	792
Ft. Yukon	2,766	27,790	11,627	7,487	2,264	2,360	6,827	9,196	8,144	6,119	3,035	9,702	10,310	6,664
Circle j	3,646	4,478 m	6,639	6,340	6,279	349	4,581	5,102	5,308	3,707	37	2,722	4,651 g	3,747
Central j	750	- m	165	73	100	0	0	0	132	0	0	0	218 g	26
Eagle j	14,800	11,557	8,027	7,985	5,630	2,070	8,263	13,115	14,916	14,486	543	11,292	7,054	10,265
Other j n			529	100	0	1,750	0	830	505	421	50	65	595 p	361
District 5 Yukon River Subtotal (Excluding Chandalar/Black Rivers)	83,107	101,024	83,646	73,144	42,361	35,408	60,343	50,664	55,048	52,758	30,302	51,127	67,219	49,823
Venetie	34	7,977	5,377	758	3,066	7,881	4,302	6,085	7,195	1,564	658	2,011	5,012	3,961
Chalkyitsik	1,068	3,000	1,499	100	274	475	1,751	845	1,230	936	433	442	1,068	1,039
Chandalar/Black Rivers Subtotal	1,102	10,977	6,867	858	3,340	8,356	6,053	6,930	8,425	2,500	1,091	2,453	6,080	5,000
District 5 Subtotal	84,209	112,001	90,513	74,002	45,701	43,764	66,396	57,594	63,473	55,258	31,393	53,580	73,299	54,823
Manley j	6,899	21,087	25,860	13,243	7,010	3,215	13,722	20,272	10,662	5,887	4,411	5,172	14,083	10,991
Minto j	2,615	2,005	3,652	5,276	3,017	301	1,419	4,782	4,381	2,361	505	781	2,850	2,690
Nenana j	26,889	25,340	12,464	17,932	13,253	5,929	11,201	15,500	14,207	3,799	6,781	5,619	14,984	10,298
Fairbanks j r	0	0	309	1,671	1,394	56	5,006	6,384	5,736	4,031	960	1,630	686	4,423
Other r s		10,222	2,283	2,347	1,039	352	2,249	2,230	1,481	3,472	1,713	2,269	3,249	2,229
District 6 Tanana River Subtotal	36,403	58,654	44,568	40,469	25,713	9,853	33,597	49,168	36,467	19,550	14,370	15,471	35,851	30,630
Upper Yukon River Total	138,991	195,195	154,322	135,346	92,646	64,449	113,318	120,819	116,726	86,542	53,661	78,225	128,189	98,213
Alaska, Yukon River Total t	154,813	211,147	167,900	145,524	107,802	76,762	123,218	130,506	128,866	95,141	62,867	89,736	141,584	108,120
Alaska, Yukon Area Total	157,075	211,303	167,900	145,524	107,808	76,882	123,565	130,860	129,258	95,141	62,901	89,940	142,270	108,345

a Historic estimated subsistence harvests are available in each year's respective Yukon Area Annual Management Report (1961 to 1998). Beginning in 1988 subsistence salmon harvest estimates have been generated from a stratified random sample of village households. Estimates include test fish catches given away. Includes commercial related harvest to produce roe sold. 1982-1988. Blanks indicate harvest information was not collected.

b The community was not surveyed, harvest estimates were calculated from calendar and post card replies.

c Average harvest includes 1988, 1989, 1992 and 1993.

d Due to floods in 1994, Hughes, Allakaket, and Alatna were not surveyed and the estimated harvest of fall chum salmon was zero.

f Alatna and Allakaket harvests are combined in 1989.

g Average harvest includes 1988 and 1990 through 1993.

h Harvests by Fairbanks subsistence permit holders who fished in District 5 near the Yukon River bridge crossing.

j In 1988 and 1989, permit and household interview data were expanded for permits not returned. Beginning in 1990, reported harvest is from returned permits only.

k Includes Birch Creek except in 1988, 1990 and 1991. A harvest of zero fall chum salmon has been estimated in all years surveyed.

m Circle and Central harvests are combined in 1989.

n Other permit holders who fished in District 5 but did not reside in the villages listed.

p Average harvest includes 1990 through 1993.

r Harvests by Fairbanks subsistence permit holders who fished in the Tanana River.

s Other permits holders who fished in District 6 but did not reside in the villages listed.

t Does not include the Coastal District.

Table 5. Commercial fall chum salmon sales and estimated harvest by area, district, and country, Yukon River drainage, 1961-2000.

	Lower Yukon Area [b]				Upper Yukon Area [a]													
					District 4			District 5			District 6			Subtotal			Total		
Year	District 1	District 2	District 3	Subtotal	Numbers	Roe	Estimated Harvest [c]	Numbers	Roe	Estimated Harvest [c]	Numbers	Roe	Estimated Harvest [c]	Numbers	Roe	Estimated Harvest [c]	Estimated Harvest	Canada Total	Grand Total
1961	42,461	-	-	42,461	-	-	-	-	-	-	-	-	-	0	0	0	42,461	3,276	45,737
1962	53,116	-	-	53,116	-	-	-	-	-	-	-	-	-	0	0	0	53,116	936	54,052
1963	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	2,196	2,196
1964	8,347	-	-	8,347	-	-	-	-	-	-	-	-	-	0	0	0	8,347	1,929	10,276
1965	22,936	-	-	22,936	-	-	-	-	-	-	-	-	-	381	0	381	23,317	2,071	25,388
1966	69,836	-	1,209	71,045	-	-	-	-	-	-	-	-	-	0	0	0	71,045	3,157	74,202
1967	36,451	-	1,823	38,274	-	-	-	-	-	-	-	-	-	0	0	0	38,274	3,343	41,617
1968	49,857	-	3,068	52,925	-	-	-	-	-	-	-	-	-	0	0	0	52,925	453	53,378
1969	128,866	-	1,722	130,588	-	-	-	-	-	-	-	-	-	722	0	722	131,310	2,279	133,589
1970	200,306	4,856	3,288	208,449	-	-	-	-	-	-	-	-	-	1,146	0	1,146	209,595	2,479	212,074
1971	188,533	-	-	188,533	-	-	-	-	-	-	-	-	-	1,061	0	1,061	189,594	1,761	191,355
1972	136,711	12,898	1,313	150,922	-	-	-	-	-	-	-	-	-	1,254	0	1,254	152,176	2,832	154,708
1973	173,783	45,304	-	219,087	-	-	-	-	-	-	-	-	-	13,003	0	13,003	232,090	2,806	234,896
1974 [d]	176,036	53,540	552	230,128	9,213	-	9,213	23,551	-	23,551	26,884	-	26,884	59,648	0	59,648	289,776	2,544	292,320
1975	188,183	51,866	5,590	245,439	13,666	-	13,666	27,212	-	27,212	18,692	-	18,692	59,570	0	59,570	275,009	2,500	277,509
1976	105,851	21,212	4,250	131,313	1,742	-	1,742	5,387	-	5,387	17,948	-	17,948	25,077	0	25,077	156,390	1,000	157,390
1977	131,758	51,994	15,851	199,603	13,980	-	13,980	25,730	-	25,730	18,673	-	18,673	58,383	0	58,383	257,986	3,990	261,976
1978	127,947	51,646	11,527	191,120	10,968	1,721	12,709	21,016	5,220	26,236	13,259	3,687	16,946	45,253	10,628	55,881	247,011	3,356	250,367
1979	109,406	94,042	25,955	229,403	48,899	3,199	52,098	47,459	8,097	55,556	34,185	7,170	41,355	130,543	18,466	149,009	378,412	9,084	387,496
1980	106,829	83,881	13,519	204,229	27,978	4,347	32,325	41,771	805	42,376	19,452	68	19,520	89,201	5,020	94,221	298,450	9,000	307,450
1981	167,834	154,683	19,043	341,760	12,082	1,311	13,393	86,620	6,955	93,575	25,969	3,019	29,008	124,691	11,285	135,976	477,736	15,260	492,996
1982	97,484	96,581	5,815	199,880	3,894	167	4,061	13,593	42	13,635	6,820	598	7,418	24,307	805	25,112	224,992	11,312	236,304
1983	124,371	85,645	10,018	220,034	4,482	1,963	6,445	43,993	0	43,993	34,089	3,101	37,190	82,564	5,064	87,628	307,662	25,990	333,652
1984	78,751	70,803	6,429	155,983	7,625	2,215	9,840	24,060	57	24,117	20,564	56	20,620	52,249	2,328	54,577	210,560	22,932	233,492
1985	129,948	40,490	5,164	175,602	24,452	2,525	26,977	25,338	0	25,338	42,352	0	42,352	92,142	2,525	94,667	270,269	35,746	306,015
1986	59,352	51,307	2,793	113,452	2,045	0	2,045	22,053	395	22,448	1,892	182	2,074	25,990	577	26,567	140,019	11,464	151,483
1987	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40,591	40,591
1988	44,890	31,845	2,090	78,825	15,662	1,421	17,083	16,989	0	16,989	21,844	1,806	23,650	54,495	3,227	57,722	136,547	30,263	166,810
1989	74,235	97,558	15,332	187,125	11,776	3,407	15,183	18,215	3,989	22,204	49,090	7,353	56,443	79,081	14,749	93,830	280,955	17,549	298,504
1990	25,269	37,077	3,715	66,061	4,989	2,351	8,166	7,778	1,058	8,976	43,182 [f]	7,535	50,975	55,949	10,944	68,117	134,178	27,537	161,715
1991	59,724	102,628	9,213	171,565	3,737	1,616	6,091	27,355	3,625	32,114	28,195	14,154	44,448	59,287	19,395	82,853	254,218	31,404	285,622
1992	0	0	0	0	0	0	0	0	0	0	15,721	2,806	19,022	15,721	2,806	19,022	19,022	18,576	37,598
1993	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7,762	7,762
1994	0	0	0	0	0	0	0	3,630	0	3,630	1	3,276	4,369	3,631	3,276	7,999	7,999	30,035	38,034
1995	79,345	90,831	0	170,176	2,924	4,126	8,731	9,778	18,815	30,033	67,855	9,560	74,117	80,557	32,501	112,881	283,057	39,912	322,969
1996	33,629	29,651	0	63,280	2,918	0	2,918	11,878	8,498	21,858	10,266	6,173	17,574	25,062	14,671	42,350	105,630	20,069	125,699
1997	27,483	24,326	0	51,809	2,458	0	2,458	2,446	1,194	3,920	0	0	0	4,904	1,194	6,378	58,187	8,068	66,255
1998	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1999	9,987	9,703	0	19,690	681	0	681	0	0	0	0	0	0	681	0	681	20,371	10,402	30,773
2000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 Year Average 1989-1993	31,846	47,453	5,652	84,950	4,100	1,475	5,888	10,970	1,734	12,659	27,238	6,370	34,178	42,008	9,579	52,724	137,675	20,566	158,240
5 Year Average 1994-1998	28,091	28,962	0	57,053	1,660	825	2,821	5,546	5,701	11,888	15,624	3,802	19,212	22,831	10,328	33,922	90,975	19,437	110,411

a Sales reported in numbers of fish sold in the round and pounds of unprocessed roe, which may include small amounts of coho salmon roe. Since 1990, efforts were made to separate coho roe from fall chum roe. Does not include department test fish sales.

b All fish sold in the round. Includes department test fish sales prior to 1988.

c The estimated harvest is the fish sold in the round plus the estimated number of females to produce the roe sold.

d In 1974, District 4 was subdivided to include Districts 5 and 6.

f Does not include 884 female fall chum salmon sold in Subdistrict 6-C with roe extracted and roe sold separately. Females are accounted for in the estimated harvest to produce roe sold.

Table 6. Yukon River fall chum salmon estimated brood year production and return per spawner estimates, 1974-1999.

Year	(P) Estimated Annual Totals			Estimated Brood Year Return: Number of Salmon [a]				Percent				(R) Total Brood Year Return [a]	(R/P) Return/ Spawner
	Escapement	Catch	Return	Age 3	Age 4	Age 5	Age 6	Age 3	Age 4	Age 5	Age 6		
1974	340,408	395,198	735,606	69,059	384,993	67,468	0	0.132	0.738	0.129	0.000	521,520	1.53
1975	1,245,304	382,200	1,627,504	116,367	1,203,589	58,797	0	0.084	0.873	0.043	0.000	1,378,754	1.11
1976	244,282	233,917	478,199	100,242	562,568	113,155	3,820	0.129	0.721	0.145	0.005	779,785	3.19
1977	371,414	353,236	724,650	98,307	887,805	153,523	3,539	0.086	0.777	0.134	0.003	1,143,175	3.08
1978	242,772	340,816	583,588	18,349	290,316	76,537	0	0.048	0.754	0.199	0.000	385,202	1.59
1979	755,922	615,377	1,371,299	35,927	650,193	223,198	3,343	0.039	0.712	0.245	0.004	912,662	1.21
1980	231,368	488,305	719,673	7,079	294,711	179,420	2,037	0.015	0.610	0.371	0.004	483,247	2.09
1981	342,154	677,257	1,019,411	37,311	820,612	240,238	8,615	0.034	0.741	0.217	0.008	1,106,775	3.23
1982	110,362	373,175	483,537	9,726	345,465	141,431	1,384	0.020	0.694	0.284	0.003	498,007	4.51
1983	212,332	525,016	737,348	10,846	742,423	182,300	1,954	0.012	0.792	0.194	0.002	937,524	4.42
1984	142,898	412,322	555,220	6,013	332,870	154,201	7,957	0.012	0.664	0.308	0.016	501,040	3.51
1985	497,620	515,481	1,013,101	38,044	774,355	248,980	2,731	0.036	0.728	0.234	0.003	1,064,110	2.14
1986	281,218	318,028	599,246	0	394,853	279,127	4,093	0.000	0.582	0.412	0.006	678,074	2.41
1987	491,040	406,365	897,405	11,405	467,735	244,256	5,868	0.016	0.641	0.335	0.008	729,263	1.49
1988	200,526	353,242	553,768	31,057	147,205	113,206	9,342	0.103	0.489	0.376	0.031	300,811	1.50
1989	389,426	541,177	930,603	2,305	210,193	295,980	16,238	0.004	0.401	0.564	0.031	524,716	1.35
1990	312,962	350,100	663,062	527	496,924	337,333	28,836	0.001	0.575	0.391	0.033	863,620	2.76
1991	341,242	439,096	780,338	3,141	826,146	333,487	12,367	0.003	0.703	0.284	0.011	1,175,141	3.44
1992	248,576	148,846	397,422	5,452	617,202	203,551	4,905	0.007	0.743	0.245	0.006	831,111	3.34
1993	238,648	91,015	329,663	7,900	455,489	123,769	9,180	0.013	0.764	0.208	0.015	596,338	2.50
1994	636,162	169,225	805,387	4,393	273,402	205,142		0.009	0.566	0.425		482,936 [d]	>0.80
1995	724,142	461,147	1,185,289	2,878	315,248							358,625 [g]	>0.50
1996	726,600	260,923	987,523	1,138									
1997	505,741	170,059	675,800										
1998	334,630	70,770	405,400										
1999	403,434	127,197	530,631										
Average	406,584	354,596	761,180										
	362,024	All Brood Years (1974-93)		30,453	545,282	188,498	6,311	0.0396	0.6851	0.2659	0.0094	770,544	2.52
	235,537	Even Brood Years (1974-93)		24,750	386,711	166,543	6,238	0.0465	0.6571	0.2860	0.0104	584,242	2.64
	488,510	Odd Brood Years (1974-93)		36,155	703,854	210,453	6,384	0.0327	0.7132	0.2457	0.0084	956,846	2.40

a The estimated number of salmon which returned are based upon annual age composition observed in lower Yukon test nets each year, weighted by test fish CPUE.
b Based upon expanded test fish age composition estimates in 1994, the year in which the test fishery terminated early.
d Brood year return includes only 3, 4, and 5 year fish, indicating that production (R/P) from brood year 1994 was at least 0.80.
g Brood year return includes only 3 and 4 year fish, indicating that production (R/P) from brood year 1995 was at least 0.49.

SECTION II

DEVELOPMENT OF MANAGEMENT/ACTION PLAN OPTIONS FOR YUKON RIVER FALL CHUM SALMON STOCK OF CONCERN AS OUTLINED IN THE SUSTAINABLE FISHERIES POLICY

SECTION II

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SECTION II

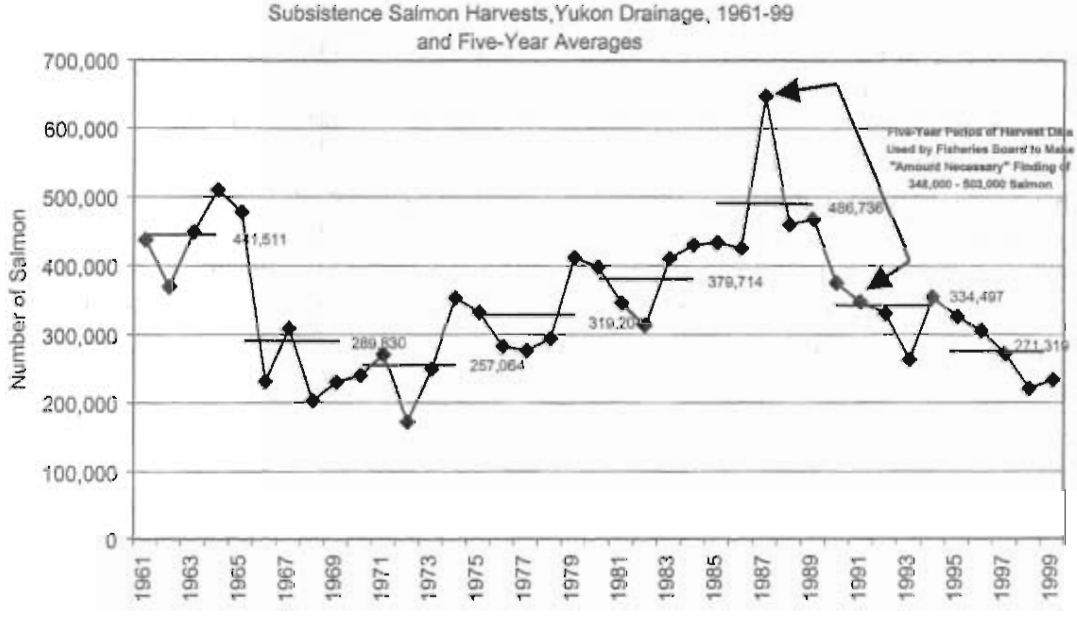
YUKON RIVER FALL CHUM SALMON MANAGEMENT PLAN REVIEW/DEVELOPMENT

Current Stock Status

In response to the guidelines established in the Sustainable Salmon Fisheries Policy, the Board of Fisheries classified the Yukon River fall chum salmon stock as a yield concern and the Toklat and Fishing Branch River stocks as management concerns during the September 28-29, 2000 work session. The determination of yield concern was based on the inability, despite the use of specific management measures, to maintain expected yields, or harvestable surpluses, above the stock's escapement needs since 1998 and the anticipated low harvest level in 2001. The determination of the management concerns was based on the chronic inability to meet existing escapement goals for the Toklat and Fishing Branch Rivers since 1997.

C&T Use Finding And The Amount Necessary

In 1993, the Board of Fisheries made a positive finding for Customary and Traditional Use for all salmon in the Yukon-Northern Area. The Amount Necessary for Subsistence was determined to be 348,000 – 503,000 salmon (all species combined). This ANS finding was based on subsistence harvests from 1987 through 1991.



Revision of Amount Necessary for Subsistence Finding

The department recommends that the Board amend 5 AAC 01.236 to include a revised finding of the amount necessary for subsistence (ANS) for the Yukon Area using updated subsistence harvest data. In establishing the ANS range, the Board should use harvest information that represents the pattern of use in the subsistence fishery. One approach

that may capture the dynamic pattern of use within the recent decade is to use the low and mean subsistence harvests for the most recent ten years. rounded down to the nearest 500 fish for the low, and rounded up to the nearest 500 fish for the high. In some years, larger portions of subsistence harvests are met by utilizing carcasses available from commercial fishing, primarily chum salmon in Districts 4, 5, and 6, and are not reflected in the following tables used to calculate ANS. The Board may also consider amending 5 AAC 01.236 to include a finding of the amount ANS for the Yukon Area, by species, and/or by district or district groups.

Objective
The objective of this recommendation is to reevaluate the previous Board's ANS finding in the Yukon Area using updated harvest information and a broader range of data to better represent the pattern and level of use in the subsistence fishery.

Options for defining the Amount Necessary for Subsistence range
In amending 5 AAC 01.236 to define the ANS range for the stock of concern, the following options may be considered:

Option A.
Status Quo. The current ANS range (348,000 – 503,000 salmon) is not amended.

The department does not recommend this option. The ANS finding for Yukon Area salmon made in February 1993 was based on inaccurate subsistence harvest information. At that time, the subsistence harvests included salmon carcasses left over from commercial roe sales and some harvests of illegally-sold commercial fish. Therefore the subsistence harvest information resulted in an inflated ANS that is greater than actual subsistence harvest patterns. The department revised the subsistence harvest survey methodology starting in 1989 to be able to determine other sources of fish available for subsistence uses. Utilizing revised subsistence harvest data would aid in developing an ANS that more accurately depicts the amount necessary for subsistence. Maintaining the status quo may prematurely trigger a Tier II permit system for the Yukon Area because the current ANS is based on inaccurate, inflated subsistence harvests.

(The following table is used to calculate ANS range for options B & C)
Yukon River Subsistence Salmon Harvests, Coastal District and Districts 1-6, 1990-99

Year	Chinook	Summer Chum	Fall Chum	Coho	Total salmon
1990	48,587	115,609	167,900	43,460	375,556
1991	46,773	118,540	145,524	37,388	348,225
1992	47,077	142,192	107,808	51,980	349,057
1993	66,704	125,574	76,882	15,812	284,972
1994	55,388	124,807	123,565	41,775	345,535
1995	50,620	136,083	130,860	28,377	345,940
1996	45,669	124,735	129,258	30,404	330,066
1997	57,117	112,820	95,141	23,945	289,023
1998	54,124	87,366	62,901	18,121	222,512
1999	53,132	83,784	89,938	20,885	247,739
Max 1990-99	66,704	142,192	167,900*	51,980*	375,556*
Min 1990-99	45,669	83,784	89,938*	20,885*	247,739*
Mean 1990-99	52,519	117,151	123,749*	34,777*	313,863*

**Excluding harvests in 1993 and 1998 because regulations restricted subsistence harvests*

Option B.

Establish the ANS range for the Yukon River drainage, all species combined, using updated harvest information and a broader range of data: **247,500 – 314,000 salmon.**

Option C.

Establish the ANS range for the Yukon River drainage by species.

- Chinook salmon: 45,500 – 52,500
- Summer chum salmon: 83,500 – 117,500
- Fall chum salmon: 89,500 – 124,000
- Coho salmon: 20,500 – 35,000

Total salmon: 239,000 – 329,000

- Other grouping: Option of combining fall chum and coho salmon, because they overlap in run timing and are inseparable by the majority of gear types used, thus management actions taken for one species greatly affects the other species.

(The following table is used to calculate ANS range for option D)

Yukon River Subsistence Salmon Harvests, 1990-99

	ALL SALMON			
Year	Coastal & Districts 1-3	District 4	District 5	District 6
1990	119,480	60,511	126,481	69,084
1991	87,390	71,695	119,526	69,614
1992	131,704	73,764	88,380	55,209
1993	134,379	43,989	82,945	23,659
1994	118,953	54,874	102,028	69,680
1995	129,661	50,549	84,320	81,410
1996	128,875	43,871	97,297	60,023
1997	118,208	51,724	81,410	37,681
1998	97,061	44,338	51,348	29,765
1999	106,371	37,800	74,427	29,141
Max 1990-99*	131,704	73,764	126,481	81,410
Min 1990-99*	87,390	37,800	74,427	29,141
Mean 1990-99*	117,580	55,599	96,734	58,980

**Excluding harvests in 1993 and 1998 because regulations restricted subsistence harvests*

Option D.

Establish the ANS range by Yukon River district or district groupings for all salmon combined:

1. Coastal District & Districts 1-3: 87,000 – 118,000 salmon
2. District 4: 37,500 – 56,000 salmon
3. District 5: 74,000 – 97,000 salmon
4. District 6: 29,000 – 59,000 salmon

Total salmon: 227,500 – 330,000

5. Other grouping.

(The following table is used to calculate ANS range for option E)

Subsistence Salmon Harvests, Yukon Area Districts, 1990-99 Mean, Maximum, and Minimum

		Coastal	District 1	District 2	District 3	Coastal, Districts 1-3	District 4	District 5	District 6	Total River
Chinook	Max 1990-99	2,363	10,423	11,516	7,715	29,970	15,801	22,111	2,712	66,704
Chinook	Min 1990-99	391	3,646	7,074	3,187	16,729	8,193	14,330	1,177	45,669
Chinook	Mean 1990-99	1,328	6,601	9,085	5,576	22,324	10,967	17,022	2,206	52,519
Summer Chum	Max 1990-99	22,235	36,999	28,453	12,143	91,683	35,812	24,164	11,661	142,192
Summer Chum	Min 1990-99	1,362	20,169	20,703	5,545	54,038	15,339	2,276	2,654	83,784
Summer Chum	Mean 1990-99	15,316	30,074	25,510	8,674	79,510	24,432	9,778	6,431	117,151
Fall Chum	Max 1990-99	392	7,770	7,382	2,706	15,162	21,232	90,513	49,168	167,900
Fall Chum	Min 1990-99*	0	3,132	3,094	415	8,599	7,898	31,393	9,853	89,938
Fall Chum	Mean 1990-99*	207	4,879	4,880	1,448	11,373	14,515	58,167	28,922	123,749
Coho	Max 1990-99	349	5,426	6,587	1,549	13,621	8,429	12,376	26,489	51,980
Coho	Min 1990-99*	0	1,730	1,695	279	4,357	1,167	2,205	4,304	20,885
Coho	Mean 1990-99*	105	2,657	3,494	767	7,001	3,397	5,848	14,968	34,777

Source: Annual harvest surveys and permits, ADF&G

**Excluding harvests in 1993 and 1998 in Districts 4-6 because regulations restricted subsistence harvests.*

Ranges for Discussion of Amount Necessary for Subsistence (ANS)*

		Coastal	District 1	District 2	District 3	Coastal, Districts 1-3	District 4	District 5	District 6	Total River
Chinook	Low Range	350	3,500	7,000	3,000	16,500	8,000	14,000	1,000	45,500
Chinook	High Range	11,500	7,000	9,000	5,500	22,500	11,000	17,500	2,500	52,500
Summer Chum	Low Range	1,000	20,000	20,500	5,500	54,000	15,000	2,000	2,500	83,000
Summer Chum	High Range	15,500	30,500	26,500	9,000	76,500	24,500	10,000	6,500	117,500
Fall Chum	Low Range	0	3,000	3,000	500	8,500	7,500	31,000	9,500	89,500
Fall Chum	High Range	200	5,000	5,000	1,500	11,500	15,000	58,500	29,000	124,000
Coho	Low Range	0	1,500	1,500	500	4,000	1,000	2,000	4,000	20,500
Coho	High Range	100	3,000	3,500	1,000	7,000	3,500	6,000	15,000	35,000

** Rounding Min 1990-99 down to nearest 500 salmon for low range and rounding Mean 1990-99 up to nearest 500 salmon for high range.*

Option E.

Establish the ANS range by Yukon River district or district groupings for each species.

1. Coastal District and Districts 1-3
   - Chinook salmon: 16,500 – 22,500
   - Summer chum salmon: 54,000 – 76,500
   - Fall chum salmon: 8,500 – 11,500
   - Coho salmon: 4,000 – 7,000
2. District 4
   - Chinook salmon: 8,000 – 11,000
   - Summer chum salmon: 15,000 – 24,500
   - Fall chum salmon: 7,500 – 15,000
   - Coho salmon: 1,000 – 3,500
3. District 5
   - Chinook salmon: 14,000 – 17,500
   - Summer chum salmon: 2,000 – 10,000
   - Fall chum salmon: 31,000 – 58,500
   - Coho salmon: 2,000 – 6,000

4. District 6
    - o Chinook salmon: 1,000 – 2,500
    - o Summer chum salmon: 2,500 – 6,500
    - o Fall chum salmon: 9,500 – 9,000
    - o Coho salmon: 4,000 – 15,000

    Total salmon: 180,500 – 316,500
5. Other grouping: Combine fall chum and coho salmon option, because they overlap in run timing and are inseparable by the majority of gear types used, thus management actions taken for one species greatly affects the other species.

Option F.

Establish an ANS range for subsistence harvests for human consumption and an ANS range for subsistence harvests for transportation (dog food). **See ACTION #2** under Action Plan Alternatives.

Benefits of the various options

Options B and C: An ANS range for the entire drainage provides the department a realistic goal that can be managed for in the absence of inseason subsistence harvest information.

Options B and D: An ANS finding grouping all salmon takes into account that households substitute among species. Grouping of species might avoid a Tier II permit system for a particular species if low harvests are being supplemented by other species.

Options C to E: An ANS range specific to the stock of concern and/or district grouping provides indices for measuring the extent to which reasonable opportunity was provided in the subsistence fishery, using postseason harvest data. A harvest above the lower bound of the ANS range indicates that there was a reasonable opportunity for subsistence uses during the previous season in the area. Harvests below the lower bound of the ANS may indicate, with other evidence, that there was not a reasonable opportunity for subsistence uses during the previous season in the area. Harvests consistently below the lower bound of the ANS directs the board to consider whether additional actions, such as establishing regulations for Tier II management actions, are necessary.

Options D and E: An ANS range specific to a district or district grouping allows for coarse management actions within that district or district grouping, without involving other areas where there may or may not be management problems. For example, a Tier II permit system might be established within one district with chronically depressed harvests to allocate harvests among subsistence households while leaving harvests in other districts without problems on a Tier I system. Grouping the Coastal District with Districts 1-3 reflect the shared gear and harvest patterns in these districts. Some families live in one district but fish in another district within the lower river.

Option E: This option requires the most refinement of findings. This level of detail may provide a measure of reasonable opportunity for each species by district or district grouping using postseason subsistence harvest data.

Detriments

All Options: If the ANS range is not set to appropriately represent the normal between-year fluctuations in subsistence harvests, a Tier II fishery may be unnecessarily triggered, thus reducing subsistence opportunity for subsistence users.

Options A, B, and D: An ANS finding for all salmon grouped together may not allow for measuring reasonable opportunity directed toward a specific stock of concern. Reasonable opportunity for subsistence would continue to be measured by harvests of a mixed set of stocks.

Options D and E: Although the ranges are not designed for inseason management, establishing ANS by district or district groupings may create unrealistic management goals because the subsistence harvest is unknown inseason. The department cannot manage for a specific level of subsistence harvest by district inseason. Measurement of success of meeting management objectives within a district can only be accomplished using postseason harvest assessments.

Preferred Option

Option C: The department prefers that the Board establish an ANS range by species for the entire Yukon River using the low and mean subsistence harvests for the most recent ten years, rounded down to the nearest 500 fish for the low, and rounded up to the nearest 500 fish for the high.

Establishing an ANS range for the entire river would be less complicated than the other options. The department cannot manage for an ANS range by district in the absence of inseason subsistence harvest information. Measuring success of providing reasonable opportunity can only be accomplished using postseason harvest information. The Yukon River district boundaries were established for delineating commercial fishing areas and have less application for subsistence fishery guidelines.

Habitat Factors Adversely Affecting The Stock

Yukon River salmon stocks have generally remained healthy due primarily to undisturbed spawning, rearing, and migration habitat although there are some habitat issues adversely impacting the production of salmon in the Yukon River drainage. A detailed discussion of these issues is found in the Yukon River Comprehensive Salmon Plan for Alaska (1998). This plan discusses mining, logging, and flood control (with these topics briefly discussed below) as well as potential pollution and habitat changes related to urban development, rural sanitation, increased traffic along tributaries, and agriculture.

Mining

The first habitat threats to salmon that were caused by human presence in the Yukon River drainage began in the early 1900s with mine exploration and development. Mining activity was, and continues to be, an important economic industry within the drainage. Fortunately, most historical mining activity occurred on localized, discrete, headwater

streams using manual labor that helped to minimize impacts on spawning habitat. However, in the 1920s mining practices expanded to include use of hydraulic mining methods and large scale dredges. Both of these mining practices disturbed extensive acreage, much of which remains un-reclaimed today. Hydraulic mining methods in particular, washed large quantities of overburden and fine sediment into downstream spawning and rearing habitats. A thorough discussion of mining activity and salmon presence in the Yukon River Area can be found in the report entitled "A History of Mining in the Yukon River Basin of Alaska" (Higgs, 1995). As is noted in the report, major mining activity has occurred on the following tributaries: the Iditarod, and Innoko River drainages in the Lower Yukon; American Creek, Eureka Creek, Minook Creek, and upper Sulatna River in the Middle Yukon; Birch Creek, Woodchopper Creek, Coal Creek, Nome Creek, Beaver Creek, and the Fortymile River in the Upper Yukon; Middle and South Forks of the Koyukuk River and Hogatza River in the Koyukuk River drainage; and Goldstream Creek, Chatanika River, Chena River, Livengood Creek, Salcha River, Goodpaster River, in the Tanana River drainage. Northern mining operations had to cope with short operating seasons, difficult transportation conditions, and high freight and labor costs. Both small and large mining operations exist today. However, more rigid enforcement of environmental regulations since the mid-1980s, has resulted in mining operations which are far less detrimental to fisheries habitat than in the past. Today, all mining operations must obtain numerous environmental permits prior to initiating or continuing mining activity. Wastewater discharge must comply with Alaska's Water Quality Standards and all mines permitted since October 14, 1991 must comply with Alaska's Mining Reclamation Regulations. Currently, two large hard rock mines are operating; the Illinois Creek mine in the Upper Innoko drainage and the Fort Knox mine near Fairbanks with a third being assessed for development near Pogo Creek of the Goodpasture River near Delta. Additional satellite hard rock mines are under assessment at Fort Knox for the Gil, Ryan Lode, and True North deposits. Some of these mines are located in potential acid-generating deposits for which strict wastewater controls will be necessary.

Logging

Logging has become a potential threat to fisheries habitat in the Tanana River drainage. With the transfer of large tracts of federal land into private native corporation and state ownership, logging activity is increasing to meet both local and export timber demands. Current concerns relate to insufficient buffer or setback zones to protect tributaries from increased runoff, increased temperature fluctuations, loss of spawning and rearing habitat, increased siltation and turbidity, and other effects which can all be stabilized or moderated with sufficient streamside vegetation. Riparian buffer standards have been developed by a Region III Forestry/Fisheries Science and Technical Committee and await statutory enactment by the Alaska Legislature.

Flood Control and Other Dams

Chena River Lakes Flood Control Project: ADF&G, YRDFA, and local sport and subsistence fishermen have raised concerns about the dam's effects on springtime emigration of salmon fry and immigration of adults. In flood years such as 1985, 1991, and 1992, the dam's gates were closed to slow the Chena River's flow to manageable

levels. This caused the river to back up and spread throughout the willow and spruce brush in the Chena River valley floodway. In some of these flood event years, seagulls and other birds were seen feeding off salmon fry at several locations. Three locations noted were; above the dam in the backed up waters, below the dam's chutes where smolt were dumped via small waterfalls, and in pools of water above the dam when the flood waters receded. The exact effects of these events upon salmon returns are unknown.

Chatanika River (Davidson Ditch) Dam: The dam was severely damaged by the 1967 flood, with the top half destroyed and washed downstream. The remainder is a sheet pile structure approximately 100 feet (30 m) long and 4 feet (1.2 m) high and blocks the entire river channel. The flow diversion gates are inoperable and the overflow apron has been completely removed by ice and flood waters. The dam has trapped sediment behind it since its construction and is believed to be a barrier to upstream fish migration. Only two species of fish (Arctic grayling and sculpin) are documented above the dam (Al Townsend, ADF&G, Fairbanks, personal communication). Three species of salmon (chinook, chum, and coho salmon), three species of whitefish, sheefish, Arctic grayling, northern pike, burbot, suckers, and sculpin are documented in the Chatanika River downstream of the dam. [1]

Habitat Projects Needed

1. Continued monitoring of Illinois Creek Mine in the Innoko River drainage.
2. Continued restoration of Birch Creek and enhancements to allow fish passage in historical mining areas. Restoration of Birch Creek tributaries whose fish habitat still remains highly impaired due to mining. Much of this mining predated the 1991 Mining Reclamation Regulations.
3. Continued restoration of Nome Creek from damage due to historic mining.
4. Continued evaluation, and possibly implementation, of modifications to the Chena River Lakes Flood Control Project to reduce salmon mortality.
5. Removal of Chatanika River Dam or construction of a bypass channel around the dam.
6. Survey and assessment of critical salmon spawning and rearing habitats in the Tanana River drainage. Continued restoration of Tanana River tributaries from historic mining damage.
7. Advanced identification of previously undocumented anadromous fish streams in the Yukon Watershed. An estimated 50% of all water bodies in the Yukon watershed have not been evaluated for distribution of anadromous species. An estimated 70% of the first and second order tributaries similarly have not been surveyed. Consequently these streams are not afforded legal protection under ADF&G's AS 16.05.870 permitting program.

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[1] Literature sources:

Townsend, Alan H. 2000. Personal communication. Alaska Department of Fish and Game, Fairbanks.

Higgs, Andrew S. 1995. A history of mining in the Yukon River Basin of Alaska. Northern Land Use Research, Inc. Fairbanks, AK.

Holder, R.R. and D. Senecal-Albrecht, compilers. 1998. Yukon River comprehensive salmon plan for Alaska. Alaska Department of Fish and Game. 162 pp.

Do New Or Expanding Fisheries On This Stock Exist?
There are no new or expanding fisheries on this stock. However, several proposals before the Board of Fisheries would increase subsistence fishing time in particular areas or allow the use of new subsistence fishing gear types potentially effecting historic harvest levels. The issues to be debated during Yukon River fall chum salmon stock of concern discussions include the following by proposal number: 120, 134, 154, 155, 157, 158, 159, 161, 162, 167, 168, 170, 171, 178, 179, and 181.

Existing Management Plan
Several management plans are utilized to manage the fall season Yukon River fisheries. The current management regime utilizes the Yukon River Drainage Fall Chum Salmon Management Plan. This plan embodies the majority of the elements that are necessary for implementing the Sustainable Salmon Fisheries Policy and reflects current management strategies during the fall season. There is also a Tanana River Management Plan and a Toklat River Rebuilding Plan.

In response to the guidelines established in the Sustainable Salmon Fisheries Policy, the department recommended to the Board of Fisheries, during the November 4-6, 2000 work session, that elements of The Toklat River Fall Chum Salmon Rebuilding Management Plan be incorporated into the Yukon River Drainage Fall Chum Salmon Management Plan regulation. The following draft of The Yukon River Drainage Fall Chum Salmon Management Plan includes a new subsection (9), which incorporates elements of 5 AAC 01.248, The Toklat River Fall Chum Salmon Rebuilding Management Plan. Additionally, the department has suggested amendments to this new subsection in staff comments for Proposal 155. These amendments include specifying the date when Subdistrict 5-A goes on a five day per week subsistence fishing schedule, and establishing a subsistence fishing schedule in the Kantishna River similar to Subdistrict 6-A (Tanana River mainstem). Proposal 154 addresses the Board's intent to consider allowing Upper Yukon commercial fisheries at run sizes between 625,000 and 675,000 fish in subsection 7 of the current plan.

Regular text indicates current regulatory language
Underlined, Italic text indicates language proposed to be added.
~~Strikethrough text indicates current regulatory language proposed to be deleted~~.

5 AAC 01.249. YUKON RIVER DRAINAGE FALL CHUM SALMON MANAGEMENT PLAN.

The objective of the management plan contained in this section is to ensure adequate escapement of fall chum salmon into the Yukon River drainage and to provide management guidelines to the department. The commissioner shall implement this plan during the period from July 16 through December 31 each year, as follows:

(1) the department shall use the best available data, including preseason projections, mainstem river sonar passage estimates, test fisheries indices, subsistence and commercial fishing reports, and passage estimates from escapement monitoring projects to assess the run size for the purpose of implementing this plan;

(2) when the projected run size is 350,000 chum salmon or less, the commissioner shall close, by emergency order, the

(A) commercial, sport, and personal use directed chum salmon fisheries; and

(B) subsistence directed chum salmon fisheries except that if indicators suggest that an individual escapement goal in a subdistrict, district, or a portion of a subdistrict or district will be achieved, the commissioner may open, by emergency order, a subsistence directed chum salmon fishery in that subdistrict, district, or portion of the subdistrict or district;

(3) when the projected run size is more than 350,000, but not more than 450,000 chum salmon, the

(A) targeted drainagewide optimal escapement goal is 350,000 chum salmon;

(B) commissioner shall close, by emergency order, the commercial, sport, and personal use directed chum salmon fisheries; and

(C) department shall manage the subsistence chum salmon directed fisheries to achieve the targeted drainagewide optimal escapement goal, except that if indicators suggest than an individual escapement goal in a subdistrict, district, or a portion of a subdistrict or district will be achieved, the commissioner may open, by emergency order, a less restrictive subsistence directed chum salmon fishery in that subdistrict, district, or portion of the subdistrict or district;

(4) when the projected run size is more than 450,000, but not more than 550,000 chum salmon, the

(A) targeted drainagewide optimal escapement goal is 375,000 chum salmon;

(B) commissioner shall close, by emergency order, the commercial, sport, and personal use directed chum salmon fisheries; and

(C) department shall manage the subsistence chum salmon directed fisheries to achieve the targeted drainagewide optimal escapement goal, except that if indicators suggest that an individual escapement goal in a subdistrict, district, or a portion of a subdistrict or district will be achieved, the commissioner may open, by emergency order, a less restrictive subsistence directed chum salmon fishery in that subdistrict, district, or portion of the subdistrict or district;

(5) when the projected run size is more than 550,000, but not more than 600,000 chum salmon, the

(A) targeted drainagewide escapement goal is 400,000 chum salmon;

(B) commissioner shall close, by emergency order, the commercial, sport, and personal use directed chum salmon fisheries, except that if indicators suggest that an individual escapement goal and identified subsistence needs in a subdistrict, district, or a portion of a subdistrict or district will be achieved, the commissioner may open, by emergency order, a sport or personal use fishery in that subdistrict, district, or portion of the subdistrict or district; and

(C) department shall manage the subsistence chum salmon directed fisheries to achieve the targeted drainagewide escapement goal, except that if indicators suggest that an individual escapement goal in a subdistrict, district, or a portion of a subdistrict or district will be achieved, the commissioner may open, by emergency order, a less restrictive subsistence directed chum salmon fishery in that subdistrict, district, or portion of the subdistrict or district;

(6) when the projected run size is more than 600,000 chum salmon, the targeted drainagewide escapement goal is 400,000 or more chum salmon, and the commissioner may open, by emergency order, a subsistence fishery according to the fishing seasons and periods specified in 5 AAC 01.210 and 5 AAC 05.367, open a personal use fishery of up to 84 hours of fishing per week, and open a sport fishery to allow for the retention of chum salmon, and,

(A) when the projected run size is more than 675,000 chum salmon, the commissioner may open, by emergency order, a drainagewide commercial fishery with the targeted harvest of the surplus above 625,000 chum salmon distribution by district or subdistrict proportional to the guideline harvest range established in 5 AAC 05.365; the department shall distribute the harvest levels below the low end of the guideline harvest range by district or subdistrict proportional to the midpoint of the guideline harvest range;

(B) it is recognized that there are difficulties and imprecision in managing the pulse type nature of the Yukon River fall chum salmon run; to compensate for the inherent complexity of the chum salmon fisheries, this plan provides for additional protection for escapement and subsistence needs by increasing the run size levels for consideration of commercial fisheries;

(7) for future versions of this management plan after the year 2000, it is the intent of the Board of Fisheries to strongly consider allowing Upper Yukon commercial fisheries at run sizes between 625,000 and 675,000 fall chum salmon; the terminal fisheries in a particular subdistrict, district, or portion of the subdistrict of district would only be considered if indicators suggest that escapement goals and identified subsistence needs in that subdistrict, district, or portion of a subdistrict or district will be achieved;

(8) ~~the provisions of this section do not apply after December 31, 2000.~~ *repealed*

(9) For management of Toklat River salmon stocks the following provisions apply:

(A) from August 15 through May 15, the Toklat River drainage is closed to sport and subsistence fishing;

(B) in the Kantishna River, subsistence salmon permits are required;

(C) salmon may be taken only by set gillnet or fish wheel after August 15;

(D) the fishery management strategy is to allow a commercial harvest that is lower than the maximum harvest level that could be supported by the Yukon River fall chum salmon return in the following areas:

a. in Subdistricts 5-A and 6-A, during the commercial fall chum salmon season there may not be more than one 24-hour commercial period per week;

b. in Subdistrict 5-A, following the commercial salmon season closure, salmon may be taken by subsistence fishing from 6:00 p.m. Tuesday until 6:00 p.m. Sunday.

(10) the provisions of this section do not apply after December 31, 2003.

Escapement Goal Review

The Department is undertaking a review of escapement goals for several Yukon River fall chum salmon stocks where long-term escapement, catch, and age composition data exist that enable the development of biological escapement goals based on analysis of production consistent with the department's escapement goal policy. The intent of the review is to recommend scientifically defensible biological escapement goals for the major fall chum salmon stocks. A detailed report will be published for each of these stocks, documenting the available data, methods for reconstruction of long term age specific runs and recruits from parent escapement, estimation and analyses of the relationship between parent spawning stock and recruitment, and recommended biological escapement goals. These reports will be prepared and, following an internal review and approval by the AYK Biological Escapement Goal review committee, will be provided for public review.

During this review the department finds that the range of proposed goals encompasses many of the existing goals, lowers goals for the Toklat and Fishing Branch Rivers, and creates new goals for the Tanana River drainage and the Chandalar River. The review attempts to reconstruct the returns and estimate the number of spawners, on average, required to provide maximum sustained yields of this chum salmon stock.

List Of Current And Proposed BEG, Or SEG's For Fall Chum Salmon.

Stream	Current Goal		Proposed Ranges	
Drainage-wide Escapement	400,000		300,000-620,000	BEG
Tanana River drainage	None		61,000-136,000	BEG
Toklat River	>33,000	BEG	15,000-33,000	BEG
Delta River	>11,000	BEG	6,000-13,000	BEG
Chandalar River	None		108,000-216,000	BEG
Sheenjek River	>64,000	BEG	43,000-86,000	BEG

The Fishing Branch River and Canadian mainstem Yukon River are located in Canada. Therefore, escapement goals for these systems are under the purview of U.S./Canada treaty negotiations. The Yukon River Canadian mainstem rebuilding step escapement

goal of >80,000 fall chum salmon is part of a rebuilding plan established by an interim Yukon River Salmon Agreement between the U.S. and Canadian governments. In 1990, the U.S./Canada Yukon River Panel (Panel) agreed to a 12-year rebuilding plan for Canadian mainstem fall chum salmon stocks. Recognizing the desirability of rebuilding stocks, the Panel agreed to an interim minimum spawning escapement objective for Canadian mainstem Yukon River of greater than 80,000 fall chum salmon. The U.S./Canada Joint Technical Committee has provided a spawning escapement goal for the Fishing Branch River of 50,000 – 120,000 fall chum salmon. The interim agreement expired in 1998. Since that time, the department has continued to endeavor to manage the fall chum salmon fisheries on the Yukon River consistent with the stock rebuilding and conservation plan that was contained within the interim agreement. As part of the recent escapement goal review, the Canadian mainstem and Fishing Branch River goals were analyzed consistent with the other fall chum salmon spawning stocks within the Yukon River drainage. This analysis resulted in proposed escapement goal ranges of 62,000 to 134,000 fall chum salmon for the Canadian mainstem Yukon River and 22,000 to 45,000 fall chum salmon for the Fishing Branch River. These proposed ranges for Canadian fall chum salmon escapements may be brought up within U.S./Canada salmon discussions in the future.

Identify Research Needed On Stock

At this time, the Yukon River does not have a comprehensive research plan similar to the plan that has been developed for the Copper River and is being developed for the Kuskokwim River. Attachment (1) provides a list of projects that have collected data pertaining to the Yukon River fall chum salmon.

ACTION PLAN DEVELOPMENT

Yukon River Fall Chum Salmon Rebuilding Goal

Reduce fishing mortality in order to meet spawning escapement goals, to provide for subsistence levels within the ANS range, and to reestablish historic range of harvests levels by other users.

Action Plan Alternatives

ACTION #1.

When the preseason projection is for very low runs and commercial fishing is likely to remain closed, reduce subsistence fishing time early in the run to help ensure that subsistence harvests do not impair meeting escapement needs or reasonable opportunity for all subsistence users.

Objective

Reduce harvest early in the run when there is a much higher level of uncertainty in projecting total run abundance, spread the harvest throughout the run to reduce the impact

on any particular component of the run, and spread subsistence harvest opportunity among the users.

Specific action recommended to implement the objective

Through public involvement in forums such as the Yukon River Drainage Fisheries Association (YRDFA), Fish and Game Advisory Committees, and Regional Advisory Councils the department will gather information for establishing what is reasonable subsistence fishing opportunity relative to run size for different areas/districts/subdistricts. In order to spread the subsistence fishing opportunity among all subsistence users, management of the subsistence fishery would use time and/or area and gear restrictions to provide for reasonable opportunity throughout the drainage while allowing fall chum salmon to pass through districts and meet escapement goals. Fisheries management would involve establishing subsistence fishing periods, and implementing gear specifications by emergency order based upon inseason run assessment and reasonable opportunity as developed through the Board of Fisheries and public process.

Example of the subsistence fishing schedule implemented on July 19, 2000.

District	Sample Fishing Schedule
Y-1, Y-2, Y-3	one 12-hour period/week
Y-4	one 24-hour period/week
Y-5	two 12-hour and one 24 hour periods/week
Y-6	one 24-hour period/week

A subsistence fishing schedule should take into account the relative efficiency of subsistence fishing gear used in the area with consideration for the species to be conserved. Based on run assessment information, fishing time would be allowed proportionally based on what is defined as reasonable subsistence fishing opportunity relative to run size for different areas/districts/subdistricts.

Inseason fall chum salmon run assessment will be based on lower river test fisheries, subsistence catch reports, age and sex composition, mainstem river sonar passage estimates, mark-recapture population estimates, and preliminary escapement monitoring information. Lower river test fish indices provide inseason data on relative abundance and run timing, which is compared to test fish indices from previous years in addition to historic fishery performance and escapement levels. The middle river projects and those located at the confluence of the Tanana River also provide progress reports as the fish move upriver and reflect differences in strength and abundance as the fish begin to segregate by stock. The majority of the fall chum salmon stocks streams of origin are located in the upper portion of the drainage delaying escapement enumeration. The department will continue to participate in Yukon River Drainage Fisheries Association and Federal Coordinating Fisheries Committee teleconferences inseason to gather information from the public and to discuss run status and management actions.

Benefits

Fall chum salmon are the only Yukon Area species for which a formal preseason projection has been established which is typically given as a point estimate of the return. However in recent years the projection has been provided in ranges that span from the

worst case scenario based on low levels of return per spawner observed the last few seasons and the average return per spawner based on parent year escapements and age composition information. These projected ranges have included fall chum salmon returns below the levels needed to meet both escapement and subsistence needs to record commercial harvest levels and therefore recent projections have not been adequate indicators of the return. By virtue of being one of the later spawning species it is possible to gain insight by analyzing the performance of other salmon returns to western Alaska and particularly those within the Yukon River drainage during the summer season. Salmon run outlooks are presented as likely levels of harvest that can be expected to be available based on these types of indicators. The run projection provides a general level of expectation and is initially used for management purposes however as the fall chum salmon migrate into the Yukon River the fisheries are managed based upon inseason assessments of the actual returns.

The Yukon River Drainage Fall Chum Salmon Management Plan defines levels of allowable harvest above escapement needs, by fishery, based on preseason and inseason run size projections. Subsistence restrictions or closures occur when run abundance is near or below the optimal escapement goal and the potential exists that typical subsistence harvests may prevent adequate spawning escapements. Under these circumstances the issue becomes management of the subsistence fishery using similar strategies as those utilized for prosecuting commercial fisheries. This form of management would continue to provide the flexibility necessary to react in a timely manner to inseason run assessment information. Under this type of management, whether applying or relaxing subsistence restrictions, it would not be necessary to go through a lengthy board process.

There have been several poor fall chum salmon runs in recent years. In 1993 and 2000, the drainage-wide escapement would not have been met even if all fisheries, including subsistence, had been closed at the beginning of the run. Subsistence restrictions were also implemented in 1998 beginning August 17. The 1998 post season run reconstruction indicated a return of 405,000 fall chum salmon with escapement estimated to be 335,000 fish which was near the optimal escapement goal of 350,000 fish as presented in the fall chum salmon management plan for run sizes less than 450,000 fall chum salmon.

Detriments

Currently subsistence harvest levels cannot be determined inseason. Management of the subsistence fishery can either be overly restrictive or too lenient prior to obtaining complete run abundance information. Subsistence fishermen could be required to forego a surplus that was not identified until it had already passed through their area or the harvest of fish needed for escapement may occur.

Subsistence issues/considerations

Potential subsistence harvest allocation issues may arise in trying to establish an equitable subsistence fishing schedule.

Performance measures

Subsistence harvest levels would continue to be determined postseason through the Yukon Area subsistence survey and fishing permit program. The department encourages fishermen to document their subsistence salmon harvest on household subsistence catch calendars or subsistence fishing permits. Postseason surveys are voluntary and they are used by the department to collect harvest information from a large number of households within the drainage. A postseason analysis of the subsistence salmon harvest will be conducted to determine if the objective was achieved.

Meeting established escapement goals could be a measure of management performance. Spreading out the harvest, by regulating fishing time, would prevent salmon from continuously being caught and allow pulses of fish to move through various areas relatively unscathed. A qualitative observation of the results in the escapement may be documented.

Research plan to address stock of concern

Continue assessment projects for inseason management. These projects are placed throughout the Yukon River drainage and assist in assessing the mixed stock fall chum salmon run. The salmon runs are managed for allocation to subsistence, sport, personal use, and commercial fisheries as well as Canadian escapement commitments.

Currently the Yukon River drainage has fairly adequate coverage with the exception of the middle Yukon River. The department recommends maintaining the Kaltag drift test fishing program in order to cover the gap in information between Pilot Station sonar project (river mile 123) and Rapids/Rampart mark and recapture project (river mile 731) or Tanana south bank test fish wheel project (river mile 695).

Additional needs include: develop a program for annual determination of inseason genetic stock identification during the transition period between summer and fall chum salmon within the Lower Yukon Area. Also make determination of destination of middle run chum salmon stocks thought to be migrating to upper Koyukuk River drainage, Chena, and Salcha Rivers, and smaller tributaries in the upper Yukon River drainage.

ACTION #2.

Establish a regulation on the amounts of fish allowed to be fed to dog teams based on the assessed level of return.

Objective

Reduce the number of fall chum salmon harvested for the purpose of feeding dogs used for transportation based on assessed levels of return.

Specific action recommended to implement the objective

Adopt regulations that specify the amounts of chum salmon to be harvested for use as dog food.

YUKON-NORTHERN AREA 5 AAC 77.XXX. SUBSISTENCE FISHING FOR TRANSPORTATION

(a) In the Yukon Area, a reasonable opportunity for the subsistence harvest of fall chum salmon for transportation is provided by the following annual household limits;

(1) [2,400**] fall chum salmon per household in years of low returns- when the projection or run size assessment is less than 600,000 fall chum salmon.

(2) no annual limit on fall chum salmon per household in years of high returns- when the projection or run size assessment is greater than 600,000 fall chum salmon.

** Based on 12 dogs fed 200 salmon per year.

Benefit

The recommended action would reduce the amount of subsistence harvests for fall chum salmon used for feeding dogs in years when returns are poor in strength yet maintain the historical use patterns in years when normal levels of subsistence fishing are allowed.

Detriments

Harvesting chum salmon under subsistence regulations for dog food has been traditional usage of the stocks. This regulation would limit the number of fall chum salmon that could be harvested as a source of food for dogs used in transportation when run size is projected to be less than 600,000 fish. This action will be difficult to enforce.

Subsistence issues/considerations

The reduction in chum salmon harvests for dog food may also reduce the quality of the salmon kept for other uses as the harvests are typically graded. Fishermen currently tend to take their subsistence harvests of fall chum salmon for dog food in the later portion of the return however under these circumstances fishermen may shift to the earlier portion of the return in order to ensure they get their quota and to increase the quality of the chum salmon taken for other purposes. Fishermen harvesting chum salmon earlier in the season for dog food will have to spend additional time preserving the catch by cutting, hanging, and tending drying fish verses the traditional cribbing in late fall when air temperatures cool down appropriately. There is a greater potential for losing harvests taken earlier in the season to spoilage. This action could result in a change of historical subsistence fishing patterns.

Performance measures

Harvest levels would be determined post season through the subsistence salmon survey and permit program. A postseason analysis of subsistence salmon harvests taken for dog food will be conducted to determine if the objective was achieved.

Research plan to address stock of concern

A research plan may be developed if applicable, should the Board accept this action.

ACTION #3.

Adopt regulations creating a Tier II subsistence fishery and Tier II permit scoring system for the stock of concern, or segments of a stock of concern, when there is a chronic inability of subsistence harvests to meet the lower bounds of the Amount Necessary for Subsistence (ANS) range established by the Board. A "chronic inability" means the continuing or anticipated inability to meet the ANS range over a four to five year period, which is approximately equivalent to the generation time of most salmon species.

Objective

The objective of this action is to create a Tier II system consistent with the sustainable fisheries policy and AS 16.05.258(b)(4), when the harvestable portion of the stock has a chronic inability to provide a reasonable opportunity for subsistence uses.

Specific action recommended to implement the objective

The language of the action option may be included as a provision of a management plan. When the threshold conditions are met, the department will bring to the board options for a Tier II system. Proposals from the public requesting Tier II management may require provisions be developed and implemented before threshold conditions are met.

Benefit

The action creates a process for the development of Tier II system when consistently poor subsistence harvests have occurred. The Tier II system may be tailored to the stock of concern, with input by the public during a noticed board meeting. Clear, measurable conditions for consideration and initiation of Tier II provisions allows the public time to discuss and develop effective Tier II factors to ensure compliance with statutory criteria.

Detriments

Failure to achieve harvest levels within the ANS range may involve other factors that are unrelated to low run abundance. Examples of factors effecting subsistence harvest may include: environmental conditions affecting harvest efficiency; changes in employment (eg. fire fighting); owner of a large dog lot moves or gets rid of the dogs; and changes in the reporting of subsistence harvests. It should be clearly established that the chronic inability to meet the ANS range is primarily due to poor salmon runs.

There may be a time lag between the development and implementation of Tier II regulations, during which opportunity by all subsistence users are restricted, rather than distinguishing among subsistence users based on statutory criteria.

Due to the imprecise nature of summer chum salmon run projections, it is possible that the run strength in a given year will be better than expected. If a Tier II fishery has been implemented, some subsistence harvesters may be denied opportunity before inseason run strength indices alert the department that the Tier II fishery is not necessary.

Administration of a Tier II process would be very expensive and difficult on the Yukon River and would not be possible to implement inseason. There are over 1,400 identified

subsistence salmon fishing households in the Yukon River drainage. Enforcement of this process would be very difficult given the immense size of the Yukon River drainage and the large potential number of subsistence fishers. Development of the ranking system would be a very long and hard process given the large number of potential applicants and the many factors involved with subsistence use and the subsistence lifestyle.

Performance measures

Performance measures of a Tier II system would be the number of persons receiving Tier II permits and the amounts of fish being harvested under a Tier II system. The intent of the law is that the harvestable portion is provided to the fishermen with the greatest dependency and fewest alternatives for obtaining human food.

Research plan to address stock of concern

A research plan may be developed if applicable, should the Board accept this action.

Attachment 1. Research projects associated with Yukon River fall chum salmon.

Past Projects	Description
Chum Salmon Stock Identification Using Scale Pattern Analysis	Determine the feasibility to estimate salmon stock composition of the various Yukon River drainage harvests through analyses of scale patterns, age compositions, and geographical distribution of catches and escapements. Project discontinued because of poor discriminatory quality of chum salmon scales.
South Fork Koyukuk River Sonar	Estimate daily escapement of fall chum salmon into South Fork Koyukuk River, 1990.
South Fork Koyukuk River Weir	Estimate daily escapement of fall chum and coho salmon into South Fork Koyukuk River, 1996 and 1997.
Galena Test Fish Wheel	Index the timing of the fall chum salmon run in the mainstem Yukon River, 1995.
Ruby Test Fish Wheel	Index the timing of fall chum salmon on the north bank of the Yukon River near Ruby, using test fish wheel. Operated from 1981 to 1991.
Tanana Village North Bank Test Fish Wheel	Index the timing of fall chum salmon on the north bank of the Yukon River bound for the upper Yukon River drainage, using test fish wheel, 1993-1999.
Tanana River Sonar	Estimate chinook and chum salmon passage returning to the Tanana River using riverine sonar, 1990.
Manley Hot Springs Test Fish Wheel	Index the timing of fall chum and coho salmon on the right bank of the Tanana River bound for the upper Tanana River drainage. Operated 1984, 1985, and 1988 to 1994 for fall chum and 1988 to 1994 for fall chum and coho salmon.
Toklat River Radio Tagging	Evaluate feasibility of using radio telemetry to estimate spawner location and residence time in Toklat spawning areas, 1997.
Toklat River Sonar	Estimate daily escapement of salmon into the Toklat River, 1994 to 1996.
Barton Creek Weir	Estimate daily escapement of fall chum and coho salmon into Barton Creek located in the Toklat River drainage, 1994 to 1996.
Tanana River Fall Chum Radio Telemetry	Conducted in 1989 to estimate total number of fall chum salmon spawning upstream of Fairbanks and to document spawner distribution with the intent to document previously unknown fall chum spawning areas.
Toklat River Fall Chum Salmon Restoration Feasibility Study	Estimate proportion of Toklat River fall chum salmon return consisting of hatchery reared fish. Estimate the proportion and timing of Toklat River fall chum salmon migrating through and or harvested in Subdistricts 5-A and 6-A. Estimate the precision of tagged fish homing within the Toklat River springs area. Operated from 1992 to 1999.
Fort Yukon Test Fish Wheels	Index the timing of fall chum salmon in the mainstem Yukon River. Investigate the feasibility of detecting differences in run timing of Porcupine and mainstem Yukon River fall chum salmon stocks based on fish wheel placement. Provide educational opportunities for area students in the operation of a salmon run-timing project. Operated in 1995 and 1996.
Black River Weir	Estimate daily escapement of fall chum salmon, and other fish species, which pass through the weir. Estimate age sex and size composition and provide educational opportunities for area students in the operation of a salmon escapement project.
Yukon Border Sonar, Eagle Alaska	Develop methods for use of split-beam sonar equipment to estimate fall chum salmon passage into Canada, to operate in Eagle, Alaska, 1992 to 1994.
Recovery of Spaghetti Tags from Fall Chum Salmon, upper Yukon River Subsistence Fishery	Operated in 1999 by Tanana Chiefs Conference to recover spaghetti tags on fall chum salmon deployed at the Rapids tagging site in the upriver subsistence fishery.

Current Projects (United States)	Description
Commercial Catch and Effort Assessment	Document and estimate catch and associated effort of the Alaska Yukon River commercial salmon fishery via fish tickets of commercial sales of salmon or salmon roe.
Commercial Catch Sampling and Monitoring	Determine age, sex, and size of salmon harvested and to monitor openings and closures in Yukon Area commercial fisheries.
Subsistence and Personal Use Catch and Effort Assessment	Document and estimate the catch and associated effort of the Yukon Area subsistence salmon fishery via interviews, catch calendars, mail-out questionnaires, telephone interviews, and subsistence fishing permits, and of the personal use fishery by fishing permits.
Sport Catch, Harvest and Effort Assessment	Document and estimate the catch, harvest, and associated effort of the Yukon Area sport fishery via post-season mail-out questionnaires.
Yukon River Salmon Stock Identification	Investigate the utility of nuclear genes, microsatellites, and SINE's in identifying U.S./Canada fall chum salmon stocks.
Yukon River Salmon Escapement Surveys and Sampling	Estimate population size, or index the relative abundance, of chinook, chum, and coho salmon spawning escapements by aerial, foot, and boat surveys. Estimate the age, sex and size of selected tributary chinook, chum, and coho salmon spawning populations.
Lower Yukon River Set Gillnet Test Fishing	Index chinook, summer and fall chum, and coho salmon run timing and abundance using set gillnets. Sample captured salmon for age, sex and size composition information.
East Fork Andreafsky Weir	Estimate daily escapement, with age, sex and size composition of chinook, summer chum, and coho salmon into the East Fork Andreafsky River. Determine the feasibility of using video and time-lapse photography to improve escapement monitoring.
Mountain Village Test Drift Gillnet Fishery	Index run timing and relative abundance for fall chum and coho salmon.

Current Projects (United State) Cont'd	Description
Yukon River Sonar	Estimate chinook, summer and fall chum, and coho salmon passage past Pilot Station in the mainstem Yukon River.
Yukon River GSI at Pilot Station	GSI sampling of chum salmon in July to try and determine the variation in timing of summer run and fall run chum salmon at Pilot Station.
Kaltag Test Drift Gillnet Fishery	Index run timing and relative abundance for fall chum and coho salmon using drift gillnets near the village of Kaltag.
Nenana River Escapement Surveys	Conduct aerial and ground surveys to count and determine the distribution of coho and chum salmon in ten tributaries of the Nenana River drainage.
Tanana Village South Bank Yukon River Fish Wheel, Test Fishing	Index the timing of chum and coho salmon on the south bank of the Yukon River bound for the Tanana River drainage, using test fish wheel, and for Toklat CWT recovery. Determine the feasibility of using stored video images as an alternative to live boxes to estimate catch per unit effort on fishwheels.
Rapids/Rampart Tagging	Passage estimate for fall chum salmon in the upper Yukon River. Operated by USFWS since 1996.
Chandalar River Sonar	Estimate daily escapement of fall chum salmon, USFWS, using split beam sonar.
Sheenjek River Sonar	Estimate daily escapement of fall chum salmon, ADF&G, using Bendix sonar.
Lower Kantishna River Tag Deployment Fish Wheel	Passage estimate based on mark recapture for fall chum salmon into the Kantishna River drainage.
Toklat River Tag Recovery Fish Wheels	Passage estimate for fall chum salmon into the Toklat River drainage.
Toklat River Index Area Foot Surveys	Estimate fall chum salmon spawning escapement. Sample age, sex , and length. Tag recovery.
Upper Kantishna River Tag Recovery Fish Wheel	Index run timing of upper Kantishna River fall chum and coho salmon. Check validity of Toklat mark-recapture for selectivity of fish wheels.
Tanana River Tagging	Passage estimate for fall chum salmon into the upper Tanana River drainage.
Upper Tanana River Test Fish Wheel	Index the run timing of chinook, summer chum, fall chum and coho salmon runs using test fish wheel. Operates near Nenana.
Delta River Index Area Foot Surveys	Estimate fall chum salmon spawning escapement. Sample age, sex , and length. Tag recovery.
Yukon River Chum Salmon Ecology Study	Study spawning habitat and factors influencing freshwater survival of chum salmon.
Database Development Project	Inventory and integrate complete complement of historical salmon abundance and ASL data to support the process of determining data shortfalls and needs, and to enhance access to historic data for inseason management purposes.

Current Canadian Projects	Description
Fishing Branch Weir	Estimate fall chum salmon spawning escapement into the Fishing Branch of the Porcupine River, Yukon Territories. Obtain age, size, tag and sex composition data.
Yukon Mark-Recapture	Estimate fall chum salmon passage on the mainstem Yukon River near the Canadian border using mark-recapture tagging study. White Rock and Sheep Rock test fish wheels.
Department of Fisheries and Oceans Escapement Index Surveys	Obtain escapement counts in index spawning areas.
Harvest sampling	Obtain age, size, sex composition of commercial, aboriginal, and test fish catches.
Commercial Catch Monitoring	Determine weekly catches and effort in the Canadian commercial fishery.
Aboriginal Catch Monitoring	Determine weekly catches and effort in the Canadian aboriginal fishery.

Proposed Future Projects	Description
Lower Yukon River Cooperative Salmon Drift Test Fishing Project	Determine feasibility of using drift gillnets to index timing, relative abundance, and correlation with current set net program for fall chum and coho salmon in the Lower Yukon River.
Sheenjek River HTI Sonar	Phase in HTI sonar on Sheenjek River to enumerate fall chum salmon.
Toklat River enumeration	Continue testing more appropriate methods to enumerate the escapement into the system.
Yukon River Salmon Traditional Ecological Knowledge	Through various forums collect information concerning all facets of fall chum salmon and their relationship with the people of the Yukon River drainage. With focuses on issues of concern and database development.